DOCUMENT RESUME

ED 442 605 RC 022 492

TITLE	Kids, Crops, & Critters in the Classroom: An Agricultural Literacy Resource Guide for Grades K-3.
INSTITUTION	Illinois Farm Bureau, Bloomington.
PUB DATE	2000-01-00
NOTE	304p.; Funding provided by the Illinois Agricultural Association Foundation. For the grades 4-6 guide, see RC 033 493.
PUB TYPE	Guides - Classroom - Teacher (052)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Agribusiness; *Agricultural Education; *Agriculture; Career Awareness; Environmental Education; Farm Occupations; Farmers; Field Crops; *Food; Lesson Plans; Livestock; Primary Education; *Rural Education; Teaching Guides
IDENTIFIERS	Farm Bureau; *Illinois

ABSTRACT

This resource guide provides teachers of grades K-3 with ideas and materials to integrate agricultural concepts into classroom activities. The guide is organized into six categories: math, science, language arts, social studies, fine arts, and health/nutrition/safety. Each of the categories contains 10 lessons organized in the following topic order: agribusiness, production agriculture, product technology, food processing, environmental science, horticulture, agriculture mechanics, agriculture economics, agriculture careers, and Illinois agriculture and general agriculture. Each lesson has been correlated with the Illinois learning standards, and a chart lists each individual lesson and related standards. Each lesson also includes background information for the teacher to use in preparing a class presentation or discussion. Complete instructions for the lesson plan activities include a list of necessary materials, procedures, related activities, and discussion questions. Student activities can be increased or decreased as appropriate for age and grade level. Worksheet masters are included that can be used as homework, quizzes, or individual assignments. Final sections of the document outline careers in agriculture and list contact information for Illinois county farm bureaus. (Contains an index.) (TD)

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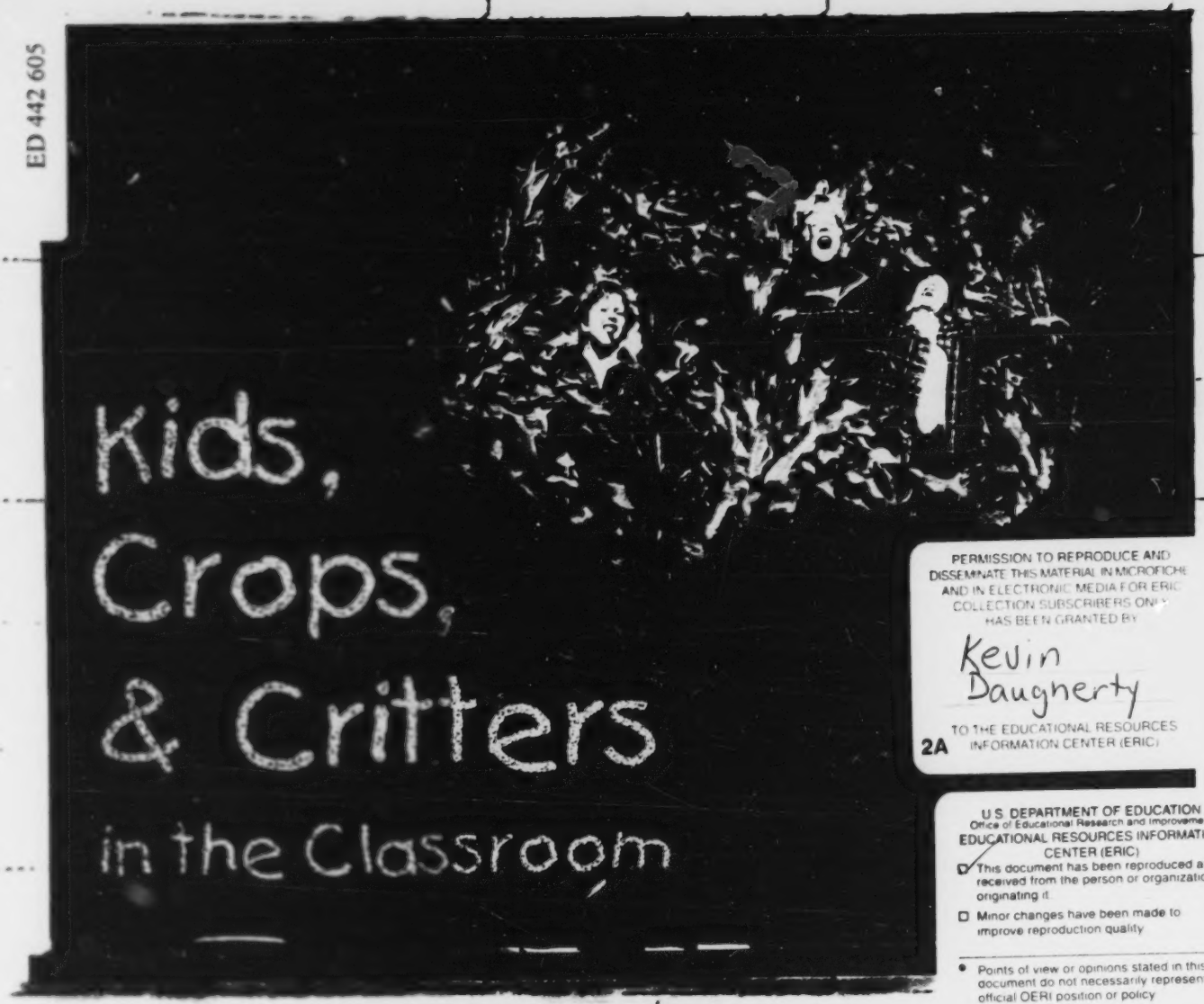

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Resource Guide for Teachers

an Ag in the Classroom Project

produced by Illinois Farm Bureau®

Grades K-3

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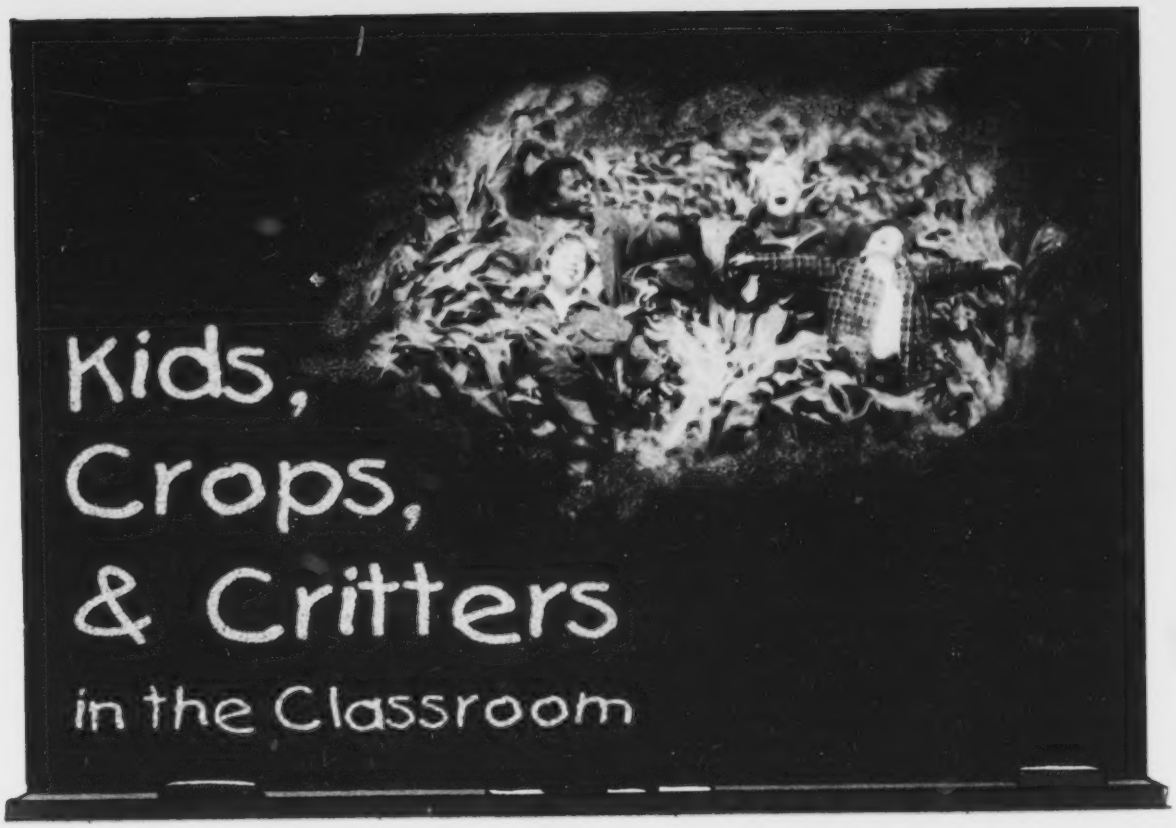

An Agricultural Literacy Resource Guide For Grades K-3

Produced by the
Illinois Farm Bureau®
with funding provided by the
IAA Foundation

Illinois Farm Bureau Agriculture in the Classroom

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January 2000

Kids, Crops, and Critters in the Classroom

Resource Guide for Teachers

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P.O. Box 2901, Bloomington, IL 61702-2901, (309) 557-3334.

Visit Our Website at www.agintheclassroom.org

A Web Site designed for teachers including:

- Marvelous Materials for your Classroom
- How to Find a Farmer to be a Guest Speaker for your Class
- How to Have Fun with Other Teachers and Receive Graduate Credit
- How to Partner with us for Ag Literacy
- A Free Sample of Ag in the Classroom Materials

A Tribute to Jerome P. Weiss

Jerome P. Weiss
IAA General Counsel
1977-1996

Family, associates, and friends of Jerome (Jerry) Weiss have made significant contributions to the IAA Foundation to publish this Ag in the Classroom Resource Guide as a tribute to his memory and service.

Mr. Weiss served the Illinois Agricultural Association as its General Counsel from 1977 to 1996.

He was truly dedicated to the IAA, its leaders, and the farmers of Illinois. In addition to his loyalty, he approached his tasks with intensity and tireless energy and provided superb counsel that will continue to serve the IAA and its affiliates well into the 21st century.

Two of Mr. Weiss' strongest professional traits were preparation and loyalty to agriculture and agribusiness. That is why this tribute is so fitting. The Ag in the Classroom Resource Guide will help teachers prepare to educate their students about the importance of agriculture and the business of food and fiber production.

He would be pleased with this guide and its purpose and grateful to those who contributed to make it possible.

Acknowledgments

The Illinois Farm Bureau® extends sincere appreciation to those who provided information, suggestions, and technical expertise during the development of *Kids, Crops, and Critters in the Classroom:*

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To The Teacher

Kids, Crops, and Critters in the Classroom adds fun and excitement to your classroom! It has been designed to provide you with ideas and materials which facilitate integration of agricultural concepts into your classroom activities and provide many hands-on activities to encourage learning. The content and format have both been designed for maximum flexibility. There are three volumes created for teachers; the K-3 guide for students at the primary level, the 4-6 guide for intermediate students, and the 7-8 guide for pre-secondary students.

The loose spiral binding allows for easier reproduction of handouts and worksheets. The guide is organized into six categories: Math, Science, Language Arts, Social Studies, Fine Arts, and Health/Nutrition/Safety. Each of these areas contain ten lessons. The ten lessons in each category are in this topic order:

Agribusiness:

The supply and sale of products and the provision of services needed for agriculture production. This applies to all aspects that help get the commodities produced and transported to market, including the supply of products that farmers need to produce commodities.

Production Agriculture:

The growing of crops or raising of livestock. Production agriculture also includes a series of acts or changes including manufacturing, conditioning, treating, preparing, and handling of agricultural products (food, fiber, forestry, and flowers).

Product Technology:

Numerous product improvements and new varieties of fruits, nuts, vegetables, and other delicious foods appear on our grocery store shelves every day. There is a great deal of research and development to compliment present scientific know-how that have made agricultural food products safer, tastier, and more convenient.

Food Processing:

Deals with transporting, grading, and processing the food to help move it from production to market.

Environmental Science:

The branch of science concerned with physical, chemical, and biological conditions of the environment and their effect on organisms. Water quality and quantity, soil conservation, and agriculture chemical usage are all areas of environmental science.

Horticulture:

Horticulture deals with raising and caring for flowers, fruits, vegetables, and ornamental plants. People who work in the field of horticulture are involved in plant propagation and breeding, genetic engineering, plant physiology, biochemistry, and many other processes.

Agriculture Mechanics:

Ag mechanics involves understanding how farm machines work, using machines and systems such as electricity and water systems on farms, and the transporting of products with machinery.

Agriculture Economics:

Ag economics includes issues that deal with production, distribution, and consumption of wealth and commodities.

Agriculture Careers:

More than 48,000 employment opportunities are available annually in agriculture and there are only 43,500 qualified graduates to fill the positions. Career information includes job requirements, training, and demand.

Illinois Agriculture and General Agriculture:

Includes information about all aspects of agriculture specific to Illinois and other general agricultural information.

By combining various components from these sections, you will be able to create instructional units or just pick out fun and interesting lessons that support your present curriculum information. We have also included a list of additional resources of state and national organizations that can provide information and/or materials related to agriculture education.

The primary goal of the Ag in the Classroom project and *Kids, Crops, and Critters in the Classroom* is to increase awareness of agricultural topics among students at all levels.

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Math																																											
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FP	Pizza Anyone?																																				X	X	X	X	X	X		
ES	Water Supply																							X					X													X	X	
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AE	Corny Math Facts																								X	X																	
AC	The Weights of Farming																														X	X											
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PA	What Grows Up? What Grows Down?																																										X	X
Tech	Milk On The Moo-ve																																										X	
FP	Better Butter																																										X	
ES	Those Amazing Earthworms																																										X	
H	How Does Your Garden Grow?																																											
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AE	Terrific Tubers													X	X			X					X							X													
AC	How a Seed Grows & Who Grows It?																																										X	
ILAG	Now You Have It, Now You Don't																																											
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AGB	Corn Harvest									X				X				X			X																						
PA	How Apples Appear					X	X		X				X	X																													
Tech	Grapes are DiVine												X					X																									
FP	Wheat Is A Treat									X			X		X			X																									
ES	What a Bean Will Be									X			X		X			X																									
H	Pumpkin, Pumpkin													X	X	X		X																									
AM	Grain – A Farm Hazard																																										
AE	Import/Export									X	X	X									X	X	X																				
AC	Hats Off to the Farmer										X	X						X																									
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ILAG	Vegetable Twister																																											

Illinois Learning Standards Index

Illinois Agriculture
Big Business Here And Overseas

Many people still think American agriculture resembles Old MacDonald's farm. But the farm and food sector is big business- it's one of the largest sectors in the U.S. economy. There are over 22 million workers involved in producing our food, processing it, and getting it to consumers.

Just 1.6 million of those people are the farmers and farm workers who grow our food. That's as many as the total number of workers in the steel and automobile industries combined!

In Illinois, about 69 percent of our land is used for farming. Most of it is used for family farm operations in which several family members are involved in some part of the business.

All Illinois citizens can be proud of the fact that the "Land of Lincoln" is one of the top farm exporting states in the nation. In 1997, Illinois farm products accounted for $3.7 billion in exports. That's 6.5 percent of the total amount of farm exports shipped to Japan, the Netherlands, and several other countries. Illinois ranks third in the U.S. in agricultural exports.

And those farm exports help offset the costs of the goods we import, such as oil and coffee.

Agriculture has become an important producer of wealth for the state of Illinois, thanks to a unique combination of factors including progressive farm families, technology, and natural soil and weather advantages. Illinois is among the leading producers in many categories of farm products from soybeans to Swiss cheese.

Illinois' agriculture is diverse. Different commodities are important to farmers in various regions of the state. Illinois continues to rival Iowa for its corn production and is a national leader in exports of both soybeans and feed grains, primarily corn.

Pork is also an important commodity. In 1998, nearly eight million pigs were born and raised on Illinois farms. The state ranks 25th in the number of beef cattle produced and is 17th in milk production. Northern Illinois and the southwest region near St. Louis are active centers of dairy activity.

Illinois' diversity is also illustrated by its claim to being the top producer of pumpkins and the number two manufacturer of Swiss cheese and cottage cheese. The state is third in the production of fresh-cut herbs. For you movie fans, we're also the third largest popcorn producer. The variety does not end there. Potatoes, horseradish, asparagus, and peaches are just a few of the other crops produced by Illinois farmers.

Major farm implement manufacturers are headquartered in Illinois. Feed mills, which turn basic grains and oilseeds into livestock feed, dot the countryside. River grain terminals link state grain producers to the export ships at New Orleans via the Illinois, Mississippi, and Ohio Rivers. And major grain and livestock futures exchanges in Chicago attract attention daily from across the globe.

Illinois farmers spend $5.5 billion yearly for production expenses such as seed, fuel, hired labor, machinery, and interest on farm mortgage debt. This translates into income for wage earners and businesses in non-farming sectors of the economy as well. For example, the purchase of a new tractor generates income not only for the local implement dealer, but also for the assembly worker at the tractor factory, stockholders in the manufacturing company, and truckers who transport the tractors from the factory.

Agriculture is big business in Illinois.

How To Use This Guide

Any of the materials in *Kids, Crops, and Critters in the Classroom* may be reproduced in reasonable quantities for educational purposes. Suggestions for using specific sections are included below.

Illinois Learning Standards Index:

Each lesson has been correlated with the Illinois Learning Standards, and an index listing each individual lesson and related standards is provided on page 8 and 9 of this guide. Teachers may easily locate specific standards and follow the column to related lessons.

Background Material:

Each lesson includes narrative information that may be used as background information for the teacher in preparing a class presentation or discussion. However, it may also provide valuable information to older or more advanced students.

As you discover information that is typical for your county, or local area, it should be included in your classroom presentation. In this way, you will be able to localize appropriate topics and make them more meaningful and enjoyable for your students. Examples might include copies of newspaper articles about local crop production or brochures about activities of an area packing plant or grain elevator.

Lesson Plan Activities:

Complete instructions are listed, including a list of necessary materials, procedures, related activities, and discussion questions. These are detailed as teacher-led activities to be presented to a group of students.

Student activity can be increased or decreased as appropriate for the age and grade level. Some of the lessons can be presented as a demonstration rather than a group hands-on activity. There are worksheet masters designed as student consumables. They may be used as homework, quizzes, or individual assignments.

Related Activities:

A variety of suggestions are included that may be suitable for a class activity, small group project, research assignment, or independent study project. Activities include bulletin board displays, field trips, art projects, etc. This section may spark ideas for additional teacher demonstrations, extra credit assignments, or individual exploration for energetic students.

Additional Resources

County Farm Bureaus*
(see page 22)

Illinois Farm Bureau*
Ag in the Classroom Program
1701 N. Towanda Avenue, P.O.Box 2901
Bloomington, IL 61702-2901
(309) 557-3334
www.agintheclassroom.org

American Farm Bureau Federation
225 Touhy Ave.
Park Ridge, IL 60068

United States Department of Agriculture
Ag in the Classroom
Attn: Dorothy Jackson
1400 Independence Ave., S.W.
USDA Rm. 3435 South
Washington, DC 20250
202-720-7925

Illinois State Board of Education
Agricultural Education Consultants
Dept. of Adult Vocational & Technical Educ.
100 N. First St.
Springfield, IL 62777
217-782-4321

Illinois Department of Agriculture
Division of Marketing and Promotion
Illinois State Fairgrounds
Springfield, IL 62794-9281
(217) 782-6675

Agriculture Council of America
11020 King St., Suite 205
Overland Park, KS 66210
(913) 491-1895
e-mail: aca@nama.org

Illinois Beef Association
2060 W. Iles Ave., Suite B
Springfield, IL 62704
(217) 787-4280

National Cattlemen's Beef Association
5420 S. Quebec St.
Englewood, CO 80111-1905
(312) 467-5520

National Broiler Council
1155 15th St., N.W., Suite 930
Washington, DC 20005
(202) 296-2622

Illinois Corn Growers Association
P.O. Box 1623
Bloomington, IL 61702
(309) 557-3257

National Corn Growers Association
1000 Executive Parkway, Suite 105
St. Louis, MO 63141

National Cotton Council of America
Communications Service
1918 N. Parkway
Memphis, TN 38112
(901) 274-9030

Check phone book for your local Soil and Water Conservation District address and phone *number.*

Association of Illinois Soil and Water Conservation Districts
Attn: Education Coordinator
2520 Main St.
Springfield, IL 62702
(217) 744-3414

National Association of Conservation Districts
509 Capitol Ct., N.E.
Washington, DC 20002
(202) 547-6223

Natural Resources Conservation Service
USDA
1400 Independence Ave., S.W.
P.O. Box 2890
Washington, DC 20013-2890
(202) 720-4525

Soil Conservation Society of America
7515 N.E. Ankeny Rd.
Ankeny, IA 50021-9764
(515) 289-2331
e-mail: swcs@swcs.org

American Dairy Association of Illinois
1 West Front Street
El Paso, IL 61738
(309) 527-4095

The National Dairy Council
10255 W. Higgens Rd., Suite 900
Rosemont, IL 60018
(847) 803-2000

St. Louis District Dairy Council
8710 Manchester Rd.
St. Louis, MO 63144-2793
(314) 961-3100

Dairy Council division offices:
(Call the office nearest you)

2004 S. Right St., Suite 118E
Urbana, IL 61801
(217) 244-5824

12615 Farmington Rd.
Hanna City, IL 61536
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3600 Wabash Ave.
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402 Ava Rd., Suite. A
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(618) 864-2421

American Egg Board
1460 Renaissance Dr., Suite 301
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Regional Office of Education
Attn: Agriculture Education Coordinator
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Rantoul, IL 61866
(217) 893-0091
(217) 893-0024 Fax
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District 3 Field Advisor
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District 4 Field Advisor
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e-mail: Webel@waterleaf.itcs.uiuc.edu

District 5 Field Advisor
Farm Credit Services Building
2560 Mascoutah Ave.
Belleville, IL 62220-3468
(618) 257-8272
e-mail: dittmar@norcom2000.com

American Association of
Family and Consumer Sciences
1555 King St.
Alexandria, VA 22314-2752
(703) 706-4600
e-mail: staff@aafcs.org

National FFA Organization
6060 FFA Drive
P.O. Box 68960
Indianapolis, IN 46268-0999
1-888-332-2668

National 4-H Council
7100 Connecticut Ave.
Chevy Chase, MD 20815-4999
(301) 961-2800

Food Marketing Institute
800 Connecticut Ave., N.W.
Washington, DC 20006
(202) 452-8444
e-mail: www@fmi.org

American Forests
910 17th St., N.W. #600
Washington, DC 20006
(202) 955-4500
e-mail: www.amfor.org
(800) 368-5748

USDA Forest Service
P.O. Box 96090
Washington, DC 20090-6090
(202) 205-1661

American Meat Institute
P.O. Box 3556
Washington, DC 20007
(703) 841-2400

National Pasta Association
2101 Wilson Blvd. #920
Arlington, VA 22201
(703) 841-0818

Illinois Pork Producers Association
6411 S. Sixth Street Road
Springfield, IL 62707
(217) 529-3100

National Pork Producers Association
P.O. Box 10383
Des Moines, IA 50306
(515) 223-2600

National Potato Promotion Board
7555 E. Hampdon, Suite 412
Denver, CO 80231
(303) 369-7783

National Safety Council
1121 Spring Lake Dr.
Itasca, IL 60143-3201
(630) 285-1121
e-mail: wilkinst@nsc.org

Illinois Lamb and Wool Producers
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El Paso, IL 61738
(309) 527-4597

American Sheep Industry Association
6911 S. Yosemite St.
Englewood, CO 80112-1414
(303) 771-3500
e-mail: info@sheepusa.org

Illinois Soybean Association
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Profit From Pumpkins

Grade Level: K-3

Approximate Length of Activity: 40 minutes

Objectives:

Teacher:

1. Provide a cooperative learning experience.
2. Use a practical application of math in agribusiness.
3. Help students learn about pumpkins.

Students:

1. Gain an understanding of a small business.
2. Practice grouping and counting by tens.
3. Gain experience in estimating.
4. Learn about pumpkin growth.

Illinois Learning Standards: 6.B.1; 6.C.1b; 8.C.1

Introduction:

The size and quality of a pumpkin crop is influenced by many different factors. These factors are water, temperature, insects, disease, fertility, soil type, pollination, plant population, variety of pumpkin, weeds, etc. To grow pumpkins, one first needs to conduct a soil test on the patch where the pumpkin seeds will be planted. A soil test will determine the type of soil and what nutrients are present in this soil. Then the planter will know what type of nutrients (fertilizers) to add to the soil.

After conducting the soil test and adding the needed nutrients, the pumpkin seeds may be planted when the ground temperature is 60-65°F and the last frost has occurred (usually May or June). The seeds should be planted five to eight feet apart, and the rows should be six to eight feet apart. Pollinating the plants needs to be done about eight to ten weeks after planting. The plants can be pollinated by bees or by hand.

After planting, and until harvesting, the pumpkins need to receive an adequate amount of rainfall and hoeing or hand weeding to ensure a good bed. One can harvest the pumpkins after the shell is completely hardened. (Pumpkin growth usually lasts between 90-110 days.) Pumpkins should be stored in a cool, dry place to keep from rotting.

For this lesson, the students are to set a price for their pumpkins, estimate how many seeds are in the pumpkin, and then decide if planting and selling pumpkins could be a profitable business. Many inputs for the business should be considered, such as: cost of

pumpkin seeds, fertilizer, people to plant seeds and care for them, people to pick the pumpkins, people to sell the pumpkins, and decisions made as to where and when to sell the pumpkins and how much to sell them for.

Materials Needed:

- "From Seed To Pumpkin" worksheet for each student
- 4 pumpkins with the "lids" cut out
- 40 paper cups
- 4 gallon-sized resealable bags

Activity Outline:

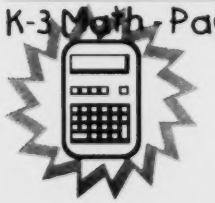
1. Divide the class into 4 cooperative learning groups and hand out the worksheet "From Seed to Pumpkin" to each student.
2. Give each group a pumpkin, 10 cups, and one resealable bag.
3. Using the worksheet, have each group record a reasonable price for its pumpkin.
4. Have each group record its estimate of how many seeds are in the pumpkin.
5. Each group should clean out their pumpkin and sort the seeds into cups by groups of 10. When all 10 cups are filled, pour the 100 seeds into a resealable bag, keeping tally of how many seeds are emptied into the bag.
6. Record how many seeds were actually in the pumpkin.
7. Discuss how many pumpkins could be grown from one pumpkin.
8. Help each group calculate how much money their pumpkin could produce by multiplying the price they would sell their pumpkins for by how many seeds were in it.

Discussion Questions:

1. Could raising and selling pumpkins be profitable? Why or why not?
2. What would you need to do to set up a business of selling pumpkins?
3. How did your group work together when counting the seeds?
4. How did putting the seeds in groups of ten help in tallying the total number of seeds?

Related Activities:

1. The Illinois Farm Bureau® Ag In The Classroom program has developed an educational magazine called *Ag Mag* 9 that offers additional information and activities about pumpkins. Please call your county Farm Bureau® for information about receiving copies to use in your classroom.
2. Brainstorm uses of pumpkins.
3. Dry the pumpkin seeds, bake them, and eat them.
4. Plant pumpkin seeds.
5. Learn the growth sequence of a pumpkin.
6. Read related stories such as:
   Pumpkin, Pumpkin by Jeanne Titherington.
   From Seed to Jack-O-Lantern, by Johnson, Lothrop, Lee and Shepard, Co.
   The Pumpkin Patch, by King, Dutton Children's Books.



To be used with:
Profit From Pumpkins

Name _____

From Seed to Pumpkin

1. The price of our pumpkin is $ _____.

2. We estimate our pumpkin has _____ seeds.
(amount)

Now it is time to clean out your pumpkin! Sort the seeds and place 10 seeds in each cup. Pour the seeds into your resealable bag.

3. How many seeds did your group put in the bag? _____

4. Our pumpkin had _____ seeds in it.
(amount)

5. We could grow _____ pumpkins from this one pumpkin!
(amount)

6. The price we would charge for one pumpkin is $ _____.

7. How much money would your group make if you sold these pumpkins?_____
(Hint: Multiply the price you would charge by how many pumpkins you could produce.)

2, 4, 6, 8, How Much Rice is on Your Plate?

Grade Level: K-3

Approximate Length of Activity: 45 minutes

Objectives:

Teacher:

1. Help the students understand plant growth and rain/irrigation needs through a classroom rice center.
2. Show students examples of patterns in the classroom and encourage them to create their own patterns.
3. Help the students develop skills to visually count by 2s, 3s, 4s, etc.
4. Teach the students about the history of rice, its nutritional value, rice products, and the milling process.

Students:

1. Manage a rice growth center and learn how water, light, and soil affect the crop.
2. Design patterns with rice kernels after studying other patterns.
3. Separate kernels into groups of 2, 3, 4, 5, etc. and then count by that number.
4. Identify the nutritional value of rice and the products that are made from it.
5. Describe the milling process of rice.
6. Learn about the history of rice.

Illinois Learning Standards: 6.D.1; 8.C.1; 9.C.1; 12.B.1b; 13.A.1c

Introduction:

Archeological evidence finds that rice has been growing for more than 5000 years. Rice seems to have originated in China and slowly worked its way to ancient Greece. Next rice was grown in Persia, and then the Nile Delta. Rice then moved across the continents until it reached the Western Hemisphere. Today, rice has grown into a crop that sustains two-thirds of the world's population.

The United States began cultivating rice over 300 years ago. Rice began growing in the U.S. when a storm-battered ship accidentally arrived at the Charleston Harbor in North Carolina. The captain of the ship gave a small amount of rice as a gift to a planter. This rice, known as "Golde Seede Rice" was grown on Carolina and Georgia plantations. The "Golde Seede Rice" soon became known as "Carolina Golde," and by 1726 Carolina Golde was the world standard for high-quality rice.

The Civil War, along with hurricanes and competition from other crops, moved the rice westward along the Gulf Coast. After this occurred, an Iowa wheat farmer realized that the soils for growing rice could support the equipment used to produce wheat. The mechanization of growing rice allowed more states to be able to produce it. Nowadays, Arkansas, Louisiana, Mississippi, Missouri, Texas, and California are major rice-producing states. And even more recently, Florida is trying its hand at producing rice.

Rice needs long, wet growing seasons that are free of cold and snow for proper growth. It also needs flat areas of wet land with heavy soil and plenty of water to flood the fields, which are called paddies. Rice production requires a lot of manual labor. One hundred acres of rice may need 100-300 laborers to prepare the soil, plant the rice, and harvest the crop.

After rice is harvested, it is taken to a mill for processing. The purpose of milling is to remove the hull and bran layers while preserving as many of the whole kernels as possible. The kernels go through a series of sorting machines, sheller machines, steaming, and drying depending on the form of rice that is desired. About 55 percent of the yields from rice milling are whole kernels, 20 percent are hulls, 15 percent are broken kernels, and 10 percent are rice bran and polish.

Rice is a very nutritious food of the bread and cereals food group in the USDA Food Guide Pyramid. It contains complex carbohydrates that provide energy to the body. Rice also contains thiamin, riboflavin, niacin, phosphorus, iron, and potassium. Rice does not contain sodium, fat, or cholesterol, which is an added benefit for those on special diets. Brown rice will give you a little more fiber, calcium, phosphorus, and Vitamin E than white rice. Although most white rice in the United States is enriched, white rice provides more iron and thiamin than brown rice.

There are many types of rice and rice products: brown rice, hot rice cereal, crispy rice cold cereal, rice cakes, steamed rice crackers, enriched white rice, fried rice, rice flour for baked goods, rice bran for baked goods, pilaf, parboiled rice, and rice bran oil. Rice may also be used in foods such as soups and muffins.

Materials Needed:

- Potting soil
- Several pots
- Shallow container
- Water
- Many types or forms of rice - for pattern making
- Rice seed - for growing (see Other Resources)
- Small plates, one per student

Activity Outline:

1. Discuss rice production and grow rice right in your very own classroom! For this activity obtain rice seeds from Kathleen Howard at Cornell University as listed in Other Resources section of this lesson. (Rice processed for food, that is sold at the grocery store, will not sprout.)

a. Place moist potting soil in pots that are at least six inches in diameter.
b. Plant three seeds per pot. Make sure they are evenly spaced.
c. Place the pot in a shallow container with two to three inches of warm water. Maintain the water level to at least one inch at all times.
d Leave the lights on for at least 12 hours per day. Or you can place the plants on a warm window sill that gets a maximum amount of light. Watch for signs of seed heads in two to three months.

2. Collect different types of rice such as long grain rice, medium grain rice, short grain rice, aromatic rice, and sweet rice. You may also want to collect different forms of rice such as rough (paddy) rice, brown rice, parboiled rice, precooked rice, and regular-milled white rice.
3. Teach the students about patterning. Show them patterns with different objects and ask the students to point out patterns in the classroom. (floor tiles, ceiling, bulletin boards, etc.)
4. Ask the students to create patterns with their rice kernels on their desktops or on a piece of paper. The patterns may be long or short, repeating as often as they like. Some examples may be long grain - short grain - short grain - long grain - short grain - short grain, etc.
5. Give each student a small plate of rice. Teach the class about counting by 2s, 3s, 4s, 5s, etc. Ask the students to separate their rice kernels into groups of 2 and then count the kernels by 2s. ("2, 4, 6, 8, 10, etc.") Next ask the students to separate their rice kernels into groups of 3s, and so on.

Discussion Questions:

1. How did rice arrive in the United States?
2. How is rice processed at a mill?
3. What types of food is rice used for?
4. What nutritional value does rice contain?
5. What types of special conditions does rice need to grow?

Related Activities:

1. Find the top growing rice states on a map. Why are they able to grow rice?
2. Bring a rice cooker to school and let the students try different types of rice.

Other Resources:

1. USA Rice Council, P. O. Box 740123, Houston, Texas 77274, (713) 270-6699.
2. *Rice: Grain of the Ancients* - A 36-page classroom resource featuring ways to engage students in exploring the history, geography, botany, cultivation, and uses of this important grass crop. Cornell University, Media Resource Center, 7 Cornell Business and Technology Park, Ithaca, NY 14850, (607) 255-2080. (Send $7.75 with your request.)
3. *Rice Seeds* - Kathleen Howard, Cornell University, Department of Soil, Crop, and Atmospheric Sciences, Emerson Hall, Ithaca, NY 14853. (Send $2 with a request for a packet of rice seed for your classroom.)

Biodegradable Plastic From Corn

Grade Level: K-3

Approximate Length of Activity: 30-45 minutes

Objectives:

Teacher:

1. Help students learn the importance of biodegradable products.
2. Use a hands-on activity to make a plastic substitute.

Students:

1. Recognize the substitution possibilities of a renewable resource (plastic from corn) for a nonrenewable resource (plastic from oil).
2. Describe an environmental reason for using corn as a source for the production of plastics.

Illinois Learning Standards: 12.E.1c; 13.A.1c; 13.B.1e

Introduction:

Plastics made from nonrenewable oil products last for thousands of years in our environment because they do not break down or disintegrate. Because they do not break down, these plastics take up valuable space in our landfills. Our landfills are filling up fast. Many experts feel the landfills in the United States will reach maximum capacity by the year 2020.

To help alleviate this problem, researchers have invented a biodegradable plastic made with cornstarch. Plastics made with cornstarch will break down and not take up space in landfills. Plus, the added benefit is that biodegradable plastic is made with a renewable resource – corn! Corn is produced every year, unlike oil. Oil is a nonrenewable resource because we only have a certain amount of it. Once we have depleted our oil reserves it will be gone. Corn can be grown every year and used to make more biodegradable plastic products.

Corn is the major feed grain grown by farmers in the U.S., leading all other crops in value and volume of production. Corn is also a major component in many foods like cereals, peanut butter, and snack foods. An ear of corn averages 800 kernels in 16 rows. A pound of corn consists of approximately 1300 kernels. An acre (about the size of a football field) of corn yielding 100 bushels produces approximately 7,280,000 kernels. Most of the weight of a bushel of corn is the starch, oil, protein, and fiber, with some added natural moisture.

Farmers grow corn on every continent of the world, except Antarctica. Hybrid varieties have been developed to adapt to specific growing conditions and locations worldwide. America exports nearly one-third of our nation's corn crop and produces over one-third of the world's corn crop.

One hundred years ago, starch was basically the only product coming from corn refining the rest of the kernel was thrown away. Today, there are uses for every part of the kernel and even the water in which it is processed. Photographic films are made from the starch portion of corn. Corn oil and cornstarch are used to make biodegradable plastic.

Corn can be made into fuel, abrasives, solvents, charcoal, animal feed, bedding for animals, insulation, smoked meat, adhesives, etc. The kernel is used as oil, bran, starch, glutamates, animal feed, and solvents. The silk is used as part of animal feed, silage, and fuels. Husks are made into dolls and as filling materials. The stalk is used to make paper, wallboard, silage, syrup, and rayon.

Materials Needed for 30 students:

- Microwave
- 2 cups cornstarch
- 1/4 cup corn oil
- 2 cups water
- 30 resealable plastic bags
- 2 pkgs. food coloring
- Medicine droppers
- Teaspoons

Activity Outline:

1. Mix 2 tablespoons cornstarch, 2 tablespoons water, and 2 drops corn oil in a resealable plastic bag.
2. Add 2 drops of your favorite food coloring to the mixture.
3. Seal the bag and knead well to a uniform consistency.
4. Heat the mixture in a microwave for 20-30 seconds at a high setting. Be careful, this is hot!
5. After the product cools, students may create a shape with the biodegradable plastic.
6. Compare this biodegradable substance with other plastics.

Discussion Questions:

1. Why is it necessary to find other forms of energy and materials instead of depending on oil?
2. Can you name an agricultural product that is saving oil or another nonrenewable resource?
3. What could you make out of this plastic if you let it harden? Remember, it will dissolve eventually. (Golf tees, some tableware, and packing peanuts are already being made from corn.)

Related Activities:

1. Contact your county Farm Bureau® to receive free copies of *Ag Mag* 11 "Corn Curl 500" from Illinois Farm Bureau® Ag in the Classroom. This issue contains information on corn production, renewable resources, types of corn, corn processing, corn uses, and career information.
2. Examine other biodegradable products from corn. (Free samples of ecofoam from National Corn Growers Association, 1000 Executive Parkway, Suite 105, St. Louis, MO 63141-6397. Ph. (314) 275-9915, biodegradable golf tees at Wal-Mart.)
3. Roar for Recycling Puppet Theater (Free from Illinois Department of Natural Resources, 524 S. 2nd Street, Springfield, IL 62701. Visit their Web Site at dnr.state.il.us/.)
4. Contact Illinois Corn Growers Association at P. O. Box 1623, Bloomington, IL 61702. (309) 557-3257.

Pizza Anyone?

Grade Level: K-3

Approximate Length of Activity: 60 minutes

Objectives:

Teacher:

1. Prepare and provide materials and information for the students to learn about the ingredients of a pizza and where they come from.
2. Provide the students with the opportunity to make and interpret graphs.

Students:

1. Take information and develop a graph to show results.
2. Identify the ingredients of a pizza and tell where the ingredients come from.

Illinois Learning Standards: 10.A.1a; 10.A.1b; 10.B.1a; 10.B.1b; 10.B.1c; 12.B.1b; 15.C.1a

Introduction:

Farming and agriculture are part of everyone's life in one way or another. From the job you might have someday to the lunch you eat today—each of these things relate to agriculture in some way. Agriculture is the industry that gives many people jobs. One out of every five students will someday work in jobs related to agriculture. Just imagine...five or six of your classmates will work in a job related to agriculture when they grow up!

How are farming and agriculture related to you? Take a look at a typical school cafeteria lunch of ham, corn, tator tots, chocolate pudding, and a bread roll. Each part of the meal is somehow related directly to agriculture. Milk comes from cows on a dairy farm. After the cows are milked on the farm, the milk must go to a dairy plant to be heated, cooled, and then bottled. The cartons are then delivered to stores—and to your school. Some of the milk will even be made into cheese and other dairy products!

Ham is a pork product that comes from pigs. And the bread is made from flour, a product of wheat. Wheat is grown and harvested on a farm, and then ground to make flour at a mill. The flour is mixed with other ingredients - like yeast - and baked in an oven at a large bakery. The loaf of bread is taken out of the bakery's oven, sliced, and packaged for delivery to the store or the school's cafeteria.

Corn is grown on a farm, as are the potatoes that were shredded for the tator tots. Both corn and potatoes are harvested and used for many things. The corn on your tray was probably canned in a factory, but the potatoes are delivered whole to a processing plant. The plant is like a big kitchen. Potatoes are peeled, shredded, cooked, and frozen in a package before they are delivered to your cafeteria. Then the cook prepares them for you to eat!

Are you ready for dessert? Even chocolate pudding is made of milk, soybeans, and corn from Illinois farms.

Agriculture is as close to you everyday as your cafeteria—and so are the jobs needed to bring your lunch from the farm, processor, and grocery store. This lesson focuses on pizza ingredients and their origins. Students will learn how the ingredients get from the farm to their plate while working on their math skills.

Materials Needed:

- "Who Makes the Best Pizza?" worksheet
- "My Favorite Pizza" worksheet
- "Ingredients in a Pizza – Where Do They Come From?" (background information)
- Supplies to make a pizza or pre-made pizza (optional)
- Oven (optional)
- Knife (optional)
- Napkins (optional)
- Actual products (tomato, pictures of animals, wheat)

Activity Outline:

1. Display the pizza items and discuss the items on display.
2. As a class, gather data for "Who Makes the Best Pizza?" worksheet. Make tallies on the chalkboard.
3. Have the students graph the information on their worksheets.
4. Collect data for "My Favorite Pizza" worksheet.
5. Have the students graph the information on their worksheets.
6. Have the students answer the questions on each worksheet.
7. Using information from "Ingredients in a Pizza – Where Do They Come From?", create a chart on the chalkboard (as a class) representing the journey from farm to the end ingredient.
8. Make a pizza. (optional)

Discussion Questions:

1. Who made the best pizza? By looking at your graph, how can you tell who made the best pizza? What is a favorite type of pizza?
2. What are some other ingredients we could put on a pizza? Where do they come from?
3. What would happen if the electricity went off? Could we make our pizza? Would some of our ingredients spoil?

Related Activities:

1. Contact Illinois Farm Bureau® to receive information about the video "Exploring Planet Pizza!" Call (309) 557-3334.
2. Visit a local pizza restaurant.
3. Compare ingredients in other Italian dishes.
4. Survey the school for favorite pizza toppings. Graph the results.
5. Design other types of graphs to show results.
6. The Illinois Farm Bureau® Ag in the Classroom program has developed a colorful educational magazine called *Ag Mag* 16 that offers additional interesting and fun information about pizza. Please call your county Farm Bureau® to find out how you can receive copies to use in your classroom.

Ingredients in a Pizza - Where Do They Come From?

Wheat - A Grain

Pizza crust is made from wheat. When wheat is ready to harvest, the farmer combines the wheat, unloads it into trucks or wagons, and takes it to the country elevator. The country elevator then ships the wheat by truck, rail, or barge to a terminal. At the terminal, the wheat is sold to the various industries which make food and feed, or is shipped overseas. The place where wheat is shipped to make food is called the mill. The mill breaks the wheat kernels into pieces and sifts the pieces to get the bran and germ (parts of the wheat kernels) out. This is repeated many times to make the substance we know as flour. The miller then adds B-vitamins and iron for nutrients. The flour is shipped in bags to the bakery or grocery store. Bakers use wheat flour because it contains a magical protein called gluten. To make crust, active yeast, warm water, and oil are added to the flour. The gluten traps the air bubbles the yeast releases and causes the crust to rise.

Tomato Sauce - A Vegetable

Tomato seeds require 75-85 days to develop into mature plants with ripe fruits. When the tomatoes are ripe enough to ship, they are carefully packed in boxes for shipping. The boxes are then loaded into semi-trailers for transporting to grocery stores. Some tomatoes are sent to a cannery where they are processed (cooked, squashed, preservatives added) to make sauces or ketchup.

Cheese - A Dairy Product

Cheese is a healthy, tasty food that is made from milk. The cows on the farm are milked by using suction cups to pump the milk from the cow into huge storage tanks. These storage tanks cool the milk until refrigerated tank trucks come to pick it up. The milk is then made into cheese. First, the milk is heated and quickly cooled. This is called pasteurizing. Pasteurizing is a process that kills any harmful bacteria. The processed milk is then treated to form a soft, custard-like substance called curd. The curd contains a liquid called whey, which must be taken out through a special process before cheese can be made. Special knives cut the curd into thousands of small cubes, and the whey oozes from them. Heating and motion force more whey from the curd, and the curd "ball" is then lifted from the vat. The "ball" is broken up into small pieces and put into presses that keep the cheese under great pressure for a few hours to a few days. During pressing more whey drains out, and the curd is shaped into blocks or wheels. After it is pressed, it is immediately wrapped in plastic. The cheese is then aged in cooled storage rooms or warehouses. The aging times vary for different cheeses. Brick cheese and others need two months to age while Parmesan requires about a year. After being aged, the cheese is packaged in a wide variety of shapes and sizes.

Pepperoni & Sausage - A Pork Product

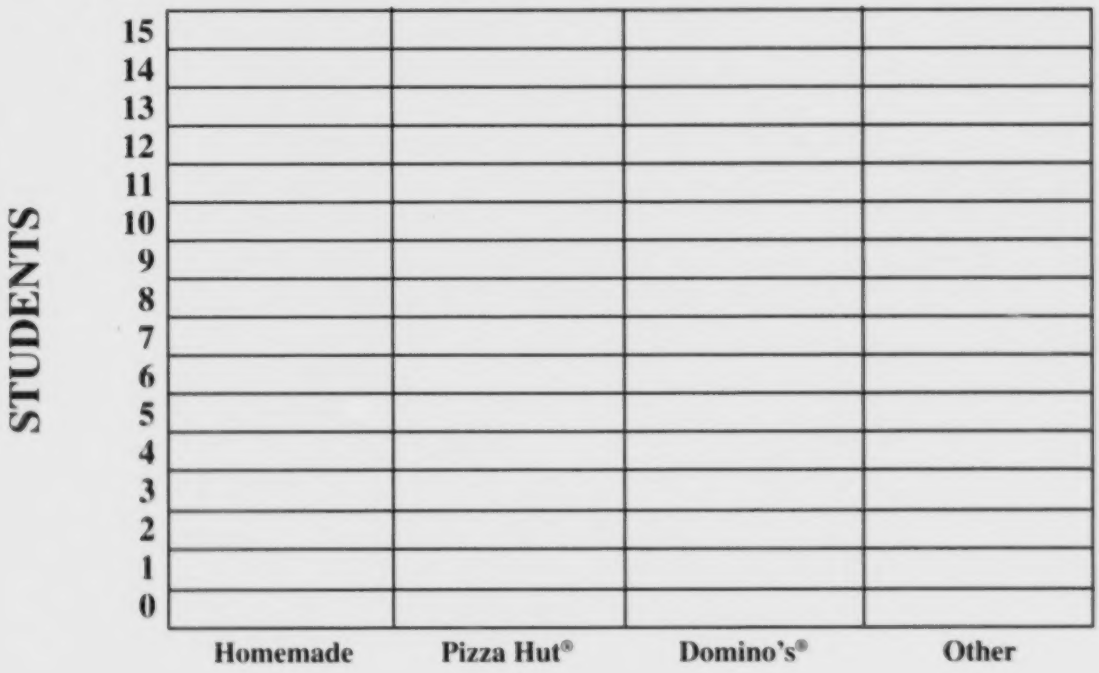
Pigs go to market in only five to six months at the weight of 240-260 pounds. Pigs may be sold at an auction market or sale barn, or may be bought directly by an order buyer who buys for a packer. Meat inspectors employed by the United States Department of Agriculture inspect live hogs, hog carcasses, and the entire packing plant to make sure that pork is safe to eat. The pork is ground up, and special seasonings are added to make sausage, salami, hot dogs, and pepperoni. About half of the pork produced in the United States is sold in supermarkets. The other half is eaten at restaurants, hospitals, schools, and business cafeterias. Yet, we get a lot more from pigs than pork—we also get insulin to treat human diabetes, and the skin from hogs is used to treat victims of severe burns. Other byproducts are glue, glass, rubber, plastics, and heart valves.

To be used with:
Pizza Anyone?

Name: _____

Who Makes the Best Pizza?

Survey each class member about his/her pizza preference. Total the number for each category on this page and then record the totals by completing the graph below.



PIZZA

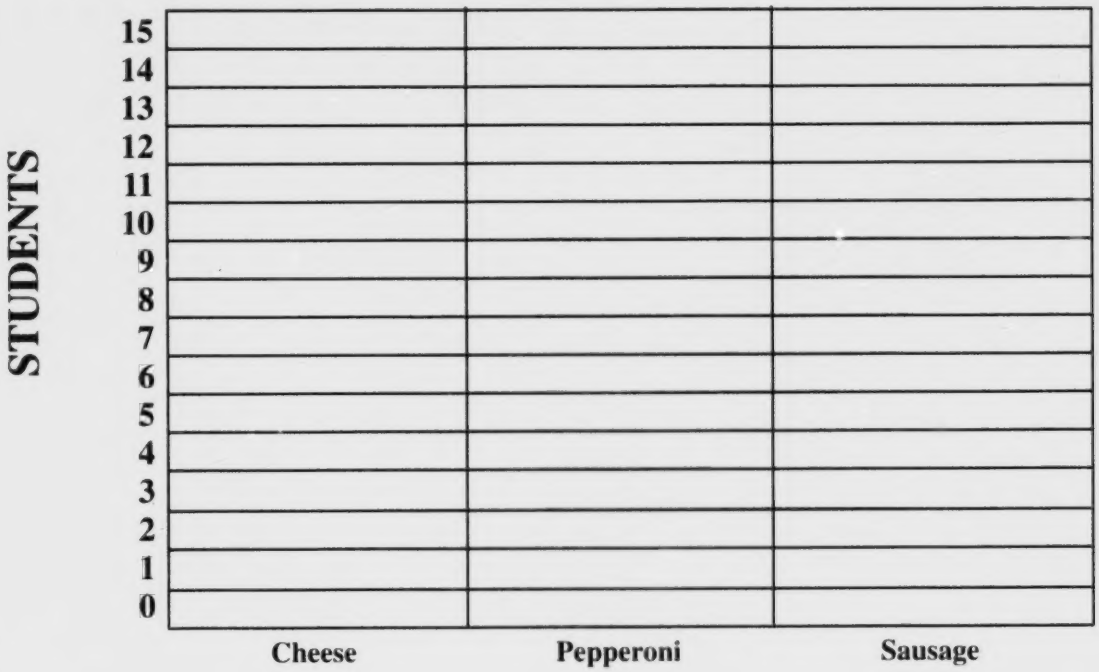
1. Who made the best pizza?_____
2. What was the least favorite pizza? _____
3. How many people said that homemade was the best pizza? _____
4. How many thought Pizza Hut® was the best pizza? _____
5. How many thought Domino's® was the best pizza?_____

To be used with:
Pizza Anyone?

Name: _____

My Favorite Pizza?

Survey each class member about his/her pizza preference. Total the number for each category on this page and then record the totals by completing the graph below.



PIZZA

1. What is your favorite type of pizza?_____
2. What type of pizza do most students like? _____
3. What pizza is the least favorite? _____
4. How many people like pepperoni? _____
5. Do more people like pepperoni than cheese?_____

Water Supply

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Help the students understand that water exists in different forms – solid, liquid, and gas, and to show the students what these look like.
2. Teach the students about the water cycle and to conduct a demonstration of the water cycle to show the students how one form changes into another form.
3. Teach the locations of water on Earth.
4. Help the students understand where different forms of water exist.
5. Teach what type of water is available for us to use.

Students:

1. Understand that water exists as a liquid, solid, and a gas.
2. Learn about the water cycle and how one form of water changes into another form.
3. Learn where water is located on Earth.
4. Know that each water location contains different forms of water.
5. Learn what type of water is available for us to use.

Illinois Learning Standards: 6.A.1b; 7.A.1a; 10.B.1c; 11.A.1a; 12.B.1a; 12.B.1b; 12.C.1b; 12.D.1b; 12.E.1a; 12.E.1c; 13.B.1d; 15.C.1b; 17.A.1a; 17.C.1a; 17.C.1b

Introduction:

One of the most important natural resources that covers the earth's surface is water. All living things depend on water for survival. As the world population continues to grow, more and more people, plants, animals, and other living creatures need water to live. Water is a renewable resource because it can be used over and over through evaporation, transpiration, and precipitation. The water that is on earth now is the same water that has always been here. No "new" water is being made.

The movement of water in and around the earth is called the water cycle. The water cycle is a continuous cycle. Rain or snow falls on oceans and land as precipitation. The soil will soak up some of the water. Plants will take up some of this water through their roots and some water will move down through the soil and become groundwater. Some of the water from the

rain and snow will run off the land into streams, marshes, lakes, and oceans. The water that remains on the earth's surface is called surface water. The surface water will return to the atmosphere through evaporation. Then water vapor may form clouds that cause precipitation – rain or snow – to occur again. The precipitation will return to the surface of the earth and the cycle will continue.

Water is extremely important for crop production because crops (plants) need water to grow. A good crop of corn or soybeans in Illinois needs at least 20 inches of water a year. Yet, almost every year, the corn and soybeans' water is limited to some degree by drought. Drought is when there is a lack of water. Some years the summer rainfall is below normal and some years there are varying amounts of rainfall throughout the season. Due to these situations, more and more farmers are installing irrigation systems to ensure that their crops receive an adequate amount of water.

Irrigation is watering land with artificial methods, or man made watering. Water is taken from lakes, rivers, streams, and wells, transported to croplands, and used to water the crops. Irrigation is used in areas that go without rainfall for a long time. Places such as the Southwest U.S., Egypt, and Italy use irrigation during dry periods or all year.

Materials Needed:

- Ice cubes
- Water
- Large, clear plastic bowl
- Clear glass
- Masking tape
- Small Container (like a butter tub)
- Small weight (like a rock w/ a diameter the size of a quarter)
- Clear plastic wrap
- Large rubber band
- 1 gallon container (such as a plastic ice cream bucket)
- Clear bowl
- Eye dropper
- 1/2 cup measuring cup
- Small plate

Activity Outline:

Part 1: Changing States

Conduct this lesson with your students to help them understand that water exists in different forms. Water can exist as a liquid (water), solid (ice), or gas (water vapor) and can change from one form to another.

A. Place one cup of water into a clear bowl. Place a piece of masking tape on the outside of the bowl at the top of the water line. Set the bowl on a sunny window sill. Check the bowl every half-hour to see what happens. The sun will warm the water

and cause the water to evaporate. This means that the water will turn from a liquid into a gas (water vapor). The amount of water in the bowl will decrease when the liquid turns into water vapor. (Remind students that we cannot see water vapor.)

B. After you place the bowl of water on the window sill, fill a clear glass three-fourths full with ice. Set the glass of ice where most students can watch it. Check the glass every 15 to 20 minutes to see what happens. Explain to your students that ice is the solid state of water. Ice will melt because the classroom is not at a cold enough temperature to keep the ice frozen. The melting ice demonstrates the change of a solid to a liquid.

C. Explain to the students that liquid water can be changed into its solid state – ice. This happens when their parents fill ice cube trays with water and put the trays in the freezer. The extremely cold temperature in the freezer changes the liquid water into ice, which is solid.

Part 2: Water Cycle

Explain to the students that water changes from one form into another naturally in the environment. To help your students understand how water changes from one form into another in nature, make a water cycle using the following directions.

A. Take the clear, large plastic bowl and place the smaller container (butter tub) in the middle of the large bowl. Pour water into the large bowl, around the small container, but not inside the small container. Fill the large bowl until the water level reaches to about three-fourths of the height of the small container.

B. Place a piece of clear plastic wrap over the large bowl. Put the rubber band around the top of the bowl to keep the plastic wrap in place. Take the weight (rock) and put it in the middle of the plastic wrap. Place the "water cycle" inside the classroom in a sunny spot (like a windowsill).

C. The sun will heat the water in the large bowl so the water will evaporate, just like the water did in the experiment above. Here the liquid form of water has changed into gas. The evaporated water (gas) will rise and condense on the plastic wrap. This means that the water vapor has turned back into liquid. The water droplets will slide down the plastic wrap until they are underneath the weight (rock). Then they will fall into the small container. The small container collects the water that has been "recycled."

Part 3: The Earth's Water Supply

A. Discuss the Earth's water supply using the information from the introduction.

B. Display the following chart on a poster or the chalkboard.

EARTH'S WATER SUPPLY

Oceans	97.3%
Ice	2.19%
Groundwater	0.5%
Soil Moisture	0.005%
Atmosphere	0.001%
Inland Lakes	0.018%
Rivers	0.000096%

C. To demonstrate how much of the earth's water supply is actually used, ask some students to help you with the following activity. (Make sure that the students understand this is just a demonstration and there is actually more water than this on earth.)
   1. Pour water into a *one-gallon* container, such as a plastic ice cream bucket. This represents all the water on the earth.
   2. Pour a *half-cup* of water out of the one-gallon container and into a clear bowl. The water in the bowl represents all of the fresh water on earth, which is less than three percent of the total water on earth. Fresh water is found in lakes, rivers, groundwater, ice, and living things. The 15 half-cups that are still in the one-gallon container represent salt water. We cannot use salt water.
   3. With an eyedropper, drop *one drop* of water from the half-cup onto a small plate. This one drop represents the freshwater that is available for our use. This water is found in rivers and lakes. The rest of the water in the half-cup is deep groundwater, water bound up as soil moisture, biomass water, or water in the atmosphere.

Discussion Questions:

1. In what forms does water exist?
2. Can one form of water change into a different form?
3. How can water change from a liquid into a gas (water vapor)?
4. How does ice (a solid) change into water (a liquid)?
5. How does a liquid (water) change into a solid (ice)?
6. What is the water cycle?
7. Why can't we use the water available in the oceans?
8. What types of water can we use?
9. Where is the water found that we can use?
10. Can you think of ways that we can conserve water?

Related Activities:

1. Invite a soil and water conservationist into the classroom to talk to the students.
2. Look on a world map to locate where water exists as a solid, a liquid, in the land, oceans, rivers, and lakes.
3. Have the students make posters to teach other students why we should not pollute water. Hang the posters around the school.
4. Learn more about how water is important to us as human beings and to all other living organisms.

Big Tree, Little Tree

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Help students learn the parts of the tree.
2. Show students how to measure objects.
3. Teach students about circumference, length, and height.
4. Assist students in composing information into bar graphs.

Students:

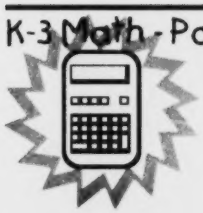
1. Identify the four parts of a tree.
2. Measure objects and record data.
3. Explain and use circumference, length, and height.
4. Construct a bar graph and explain the data.

Illinois Learning Standards: 7.A.1a; 7.B.1a; 10.A.1b; 12.A.1a; 12.B.1b; 17.B.1a; 17.B.1b; 17.C.1a

Introduction:

There are three main parts of the tree. These parts are the trunk and branches, the leaves, and the roots. The trunk, branches, and roots of a tree contain heartwood, xylem, cambium, phloem, and bark. The heartwood is the center of the tree and gives the tree support. Heartwood is old xylem and no longer transports water and minerals. The xylem carries water and minerals to the leaves from the roots. The cambium is a thin layer of tissue that surrounds the xylem. The cambium grows to make the trunk, branches, and roots grow thicker. The phloem is soft tissue in a layer surrounding the cambium. The phloem transports food made by the leaves to other parts of the tree, including the roots. The outer layer, or the cork layer, is called the bark. The bark, which is hard, dead tissue, protects the living inner parts of the tree. The bark also stretches to let the trunk and branches grow thicker, although on most trees the bark does not easily stretch. As the branches and trunk grow, they push against the bark and eventually some of the bark will crack and dry to become rough.

Trees help our environment in many ways. Trees act as windbreaks to protect houses and buildings and to keep the wind from blowing the topsoil away. The roots of trees help prevent



soil from being washed away during heavy rains because the roots and root hairs hold the soil in place. Trees also help to make soil. The leaves add organic matter to the soil and roots break soil and rocks down into smaller pieces. Forests provide a sheltered environment for wildlife, and forests in mountain regions prevent snow from sliding down and causing avalanches.

Trees also add water to the air. Not all of the water trees absorb is used to make food for the tree. Most of the water is lost through transpiration, which puts water back into the air. This added moisture to the air helps to make rain.

Materials Needed:

- "Tree Measurements" worksheet
- String
- Paper
- Pencil
- Yard stick
- Tape Measures

Activity Outline:

1. Put the students into groups of 2 to 5 students each. For this activity, you will be measuring trees in the schoolyard or a nearby park. Each group will be measuring one tree so you can have as many groups as there are trees. Before beginning the measuring, label each tree with a number to identify trees later on. (You may also do this activity as a class.)
2. Have each group conduct the following measurements: Record these measurements on the "Tree Measurements" worksheet.)
   A. Circumference: Measure from the ground to 4 1/2 feet high on the trunk of the tree. At this height, measure the circumference of the tree's trunk. Wrap the string around the trunk, mark where the string meets, and then measure the length of the string (to the mark). Record the circumference of the tree to the nearest inch.
   B. Crown: Next, find the tree's longest branches. Place a marker on the ground beneath the tip of the longest branch. Find the branch opposite to this branch, on the other side of the trunk. Place a marker on the ground beneath its tip. Measure the distance between the first marker and the second marker. Measure in feet and round the answer to the nearest foot. Record the length of the tree's crown.
   C. Height: Have one person stand at the base of the tree with the yard stick vertically in front of him/her. Holding the yard stick vertically, and keeping his/her arm straight, have him/her back away from the tree until the tree and the yard stick appear to be the same size. Have the second person measure how many feet there are between the tree trunk and the person holding the yard stick. This is the height of the tree. Round the answer to the nearest foot and record it.

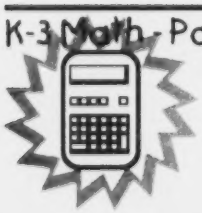
3. Make sure all the students understand how to measure the circumference, crown, and height. Check to see if their numbers are realistic compared to other groups. Some remeasuring may have to be done.
4. Back in the classroom, have each group make a bar graph of its tree's measurements. Display the graphs together on a bulletin board.
   Teaching Tip: Keep the measurements of the trees from this year. Next year have your class measure the same trees and compare the differences in the trees' heights, trunk sizes, and circumferences.

Discussion Questions:

1. What are circumference, length, and width?
2. Which tree is the tallest? The shortest?
3. Which tree has the largest circumference? The smallest?
4. Which tree has the biggest trunk? The smallest?
5. What are some parts of the tree?

Related Activities:

1. Measure other objects, graph the data, and compare the information.
2. Invite a Conservation Officer into the classroom to further discuss the importance of trees.
3. Find a location in the schoolyard that needs a tree and have the class plant a tree.



To be used with:
Big Tree, Little Tree

Name _____

Tree Measurements

Conduct the following measurements in groups:

1. **Circumference**: Measure from the ground to 4 1/2 feet high on the trunk of the tree. At this height, measure the circumference of the tree's trunk. Wrap the string around the trunk and then measure the length of the string. Record the circumference of the tree to the nearest inch.

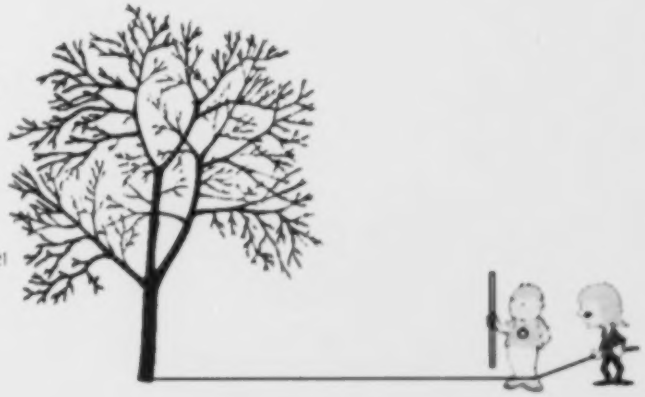
My tree's circumference is: _____ inches

2. **Crown**: Find the tree's longest branches. Place a marker on the ground beneath the tip of the longest branch. Find the branch opposite to this branch, on the other side of the trunk. Place a marker on the ground beneath its tip. Measure in feet and round the answer to the nearest foot. Record the length of the tree's crown.

My tree's crown is: _____ feet

3. **Height**: Have one person stand at the base of the tree with the yard stick vertically in front of him/her. Holding the yard stick vertically, and keeping his/her arm straight, back away from the tree until the tree and the yard stick appear to be the same size. Have the second person measure how many feet there are between the tree trunk and the person holding the yard stick. This is the height of the tree. Round the answer to the nearest foot and record it.

My tree's height is: _____ feet



What Kind of Horse Are You?

Grade Level: K-3

Approximate Length of Activity: 20 minutes

Objectives:

Teacher:

1. Discuss the transformation in agriculture from "horse power" to tractor power.
2. Introduce students to horses by explaining general information.
3. Show students how to use a tape measure and record inches.
4. Explain how to read a chart.

Students:

1. Understand that farm machinery technology has brought great improvements in agriculture.
2. Learn about horses and their usefulness to farmers before tractors were widely used.
3. Demonstrate an understanding of measurement by measuring classmates with a tape measure and recording their height.
4. Understand how to read a chart.

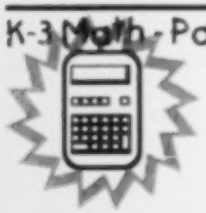
Illinois Learning Standards: 7.A.1a; 10.A.1a; 10.B.1b; 10.B.1c; 16.A.1b

Introduction:

Horses have been useful animals for thousands of years. Horses are great for working and running. They have strong teeth, sharp ears, keen eyes, and a good sense of smell. A horse has larger eyes than any other land animal except the ostrich and the two eyes can move independently. A horse can look forward with one eye and backward with the other eye. They have wide nostrils to help them breath easily and also have long, muscular legs that give them strength to pull loads and run at fast speeds.

There are more than 150 breeds and types of horses and ponies. These various breeds are divided into three main groups: (1) light horses, (2) heavy horses, and (3) ponies. Light horses have thin legs, small bones, and weigh less than 1300 pounds. Heavy horses have large bones, thick, sturdy legs, and weigh more than 2000 pounds. Ponies are small horses that stand less than 58 inches high when full grown and weigh less than 800 pounds.

Horses are measured in a unit called *hands*. One hand equals four inches. The horse is measured from the ground to the highest point of the withers. The withers is the ridge between the shoulder bones.



A mare is a female horse that is more than four years old. A pregnant mare will carry her foal for about 11 months. Foals are the newborn male or female horse. Foals are able to stand shortly after they are born and within a few hours they can run about. The foal then becomes a colt, which is a male under four years of age, or a filly, which is a female horse less then four years of age.

Horses have three natural gaits - (1) walk, (2) trot, and (3) canter. The walk is the slowest gait where a horse moves about four miles an hour.

A horse's stomach only holds about 18 quarts of food, which is small compared to the size of a horse's body, so it needs to be fed a meal of grass, grain, hay, and oats. A horse should never eat dusty or moldy feed or feed that contains sticks, thorns, or rubbish. Every day a horse needs 10 to 12 gallons of fresh water, as well as free access to salt to stay healthy. This is because horses lose salt when they sweat.

To maintain their health, horses kept in a stable need to be groomed daily. A rubber currycomb, body brush, hoof pick, and mane and tail comb will help to remove dirt and dandruff from the horse's coat and remove dirt, stones, and other objects from the feet.

For nearly two hundred years, the horse was our only supply of power on the farm, thus the expression "horse power." Until the tractor was developed in the early 1900s, the work-horse supplied the power to pull farm implements over every acre of soil planted. As settlers came to America, the horse was depended upon for transportation, to pull heavy wagons, and to help clear the land and plow the fields. Often, they provided the only link between settlements and towns. Even after our railway systems developed, horses were the most popular means of transportation. Our early street cars and fire engines were also "horse powered."

In the "good old days" a farmer would have to keep as many as six teams of horses for farm labor. That meant spending an hour each morning just to feed and harness the "machines" (horses) before going to work in the fields. It took another hour at the end of the day to put the "machines" to bed. Since these "machines" came without headlights, a farmer couldn't work after the sun went down, not to mention the fact that the machines would eat as much as one fifth of the crops for energy! You'd think with all that animal labor a farmer would have more than enough help. But during heavy harvest times, as many as 20 extra people might be needed to help do the work on a 440-acre farm.

It would be nice if that was the way things happened. But, like most revolutions, the change from horses to mechanical horsepower was slow to catch on. Tractors were first introduced in the Midwest around the turn of the century. But those first machines were cumbersome, inefficient, steam-operated vehicles. It wasn't until the middle 1930s that tractors improved enough to really replace mules and horses as a labor source.

It was this second generation of tractors, along with other machines and farm equipment, which helped pull American agriculture through those grim days of the Depression, into the most efficient and productive industry the country had ever seen. Like other industries in this country, agriculture has benefited from many improvements in technology. It's no accident that today's farmer can farm more land, and produce more food more efficiently, than ever before.

If farmers had to rely on horse power to produce food, our nation would need 20 times the number of horses alive today, and five times the number of farm workers. Grain prices would increase more than 50 percent. In 1920, two people and eight horses were required to farm 160 acres. Today, one farmer can handle over 400 acres. This is at least five times as much as one farmer used to be able to handle.

Horses are still important in agriculture, particularly in the western U.S. Horses are still used on cattle ranches for roping and branding cattle and for carrying cowboys through rough country to help round up the herds. Horses are also used in non-agricultural settings. In large cities like Chicago, horses are used by police to patrol busy areas which are often clogged with traffic. Horses are also used for recreation. Many people ride horses for pleasure, rodeos, and trained horse acts in the circus are still popular. Two sports - polo and horse racing - use horses which are bred and trained specifically for that purpose.

Materials Needed:

- "What Kind of Horse Are You?" worksheet
- Tape measures - one per group

Activity Outline:

1. Discuss general horse information and the transformation from "horse power" to tractor power.
2. Explain to the students how horses are measured.
3. Divide the students into groups of two.
4. Have the students take turns measuring one another in inches. The students should measure each other from the ground to the top of their shoulders, like horses are measured. The students should then take this number and, with the teachers help, divide it by four to find out how tall they are in hands.
5. Have the students find their height in hands on the chart below. The students will then discover what type of horse they are.
6. Once the students figure out what type of horse they are, have them research this horse. The students can find where the horse originates, the classification of their horse (light, heavy, pony), what their horse is known for (racing, pulling loads, etc.), how much their horse weighs, and what color their horse is. The students should show a picture of their horse, if possible. The teacher should tailor the presentation to each grade level.

Discussion Questions:

1. How many inches are in a hand?
2. How is a horse measured?
3. How were horses important to agriculture in previous generations? What has replaced them?
4. How are horses important to agriculture now?

Related Activities:

1. Make your own horse feed sack. Horses eat and drink water, corn, oats, hay, sugar beet pulp, and bran. These foods provide for their nutritional needs. (Water-water, corn-protein/carbohydrates, oats-protein/vitamin B, hay-protein/minerals, vitamins, sugar beet pulp-carbohydrates, bran-protein/carbohydrates) Make a feed sack substituting horse feed for human food. (water-blueberry jellybeans, corn-candy corn, oats-granola, hay-shredded wheat, sugar beet pulp-M & M's, bran-Cheerios)
2. Pretend you are packing for a pony trek, a ride that lasts many days. (These are usually in the countryside and the group comes back to the stable each night.) What would you need? (clothes for hot or cold weather, T-shirts, warm sweaters, riding or corduroy trousers, lace-up shoes or riding boots, another pair of boots for stable work on wet days, hard hat, horse equipment, saddle bag with your lunch and feed for the pony, gloves, etc.)
3. Create a timeline of farm machinery. When was each machine invented and how has it improved?
4. Interview an agriculture engineer. What types of improvements do they make on farm machinery?

Other Resources:

1. "The Tennessee Walking Horse . . An American Tradition" workbook, Tennessee Walking Horse Museum, Calsonic Arena, Shelbyville, TN 37160, (615)684-0314.
2. *The Usborne Guide to Riding and Pony Care* by Christopher Rawson, Joanna Spector, and Elizabeth Polling.
3. *Leah's Pony* by Elizabeth Friedrich.
4. *Horsepower* by Cris Peterson.
5. *Thoroughbred* by Joanna Campbell.
6. *Your Pony, Your Horse: A Kid's Guide to Care and Enjoyment* by Cherry Hill.
7. *A Tractor Goes Farming* by Roy Harrington.
8. *Tractor Trouble* by Steve Augarde.
9. The Illinois Farm Bureau® Ag in the Classroom program has developed a colorful educational magazine called *Ag Mag* 7 that offers additional interesting and fun information about animal care. Please call your county Farm Bureau® to find out how you can receive copies to use in your classroom.

To be used with:
What Kind of Horse Are You?

Name: _____

What Kind of Horse are You?

Use a tape measure to measure a classmate's height.

Inches	Hands	Horse
36-44.8	9-11.2	Shetland Pony
44.8-52.8	11.2-13.2	Pony of the Americas
48-56.8	12-14.2	Hackney Pony
56.8-61.2	14.2-15.3	Arabian
60-68	15-17	Thoroughbred
64-76	16-19	Belgian

1. How tall are you?

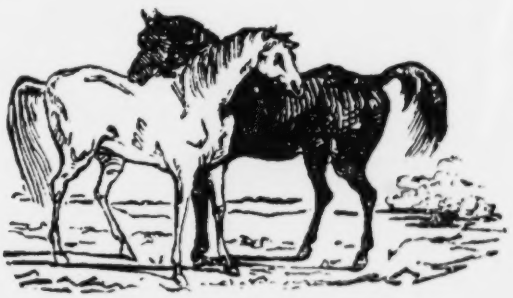
   Inches _____ Hands _____

2. What kind of horse are you?

3. How tall was the classmate you measured?

   Inches _____ Hands _____

4. What kind of horse is he/she?



Corny Math Facts

Grade Level: K-3

Approximate Length of Activity: 30 minutes

Objectives:

Teacher:

1. Illustrate a story problem involving corn economics.
2. Introduce information on corn production.

Students:

1. Solve math story problems on corn economics.
2. Work cooperatively in groups.

Illinois Learning Standards: 6.A.1a; 6.B.1; 6.C.1a; 15.C.1a

Introduction:

Corn is one of nature's most amazing energy-storing devices. A corn seed weighs about one hundredth of an ounce. Yet this tiny seed can produce a corn plant that will grow seven to 10 feet tall and will produce between 600 and 1000 seeds like the one from which the plant started. The seeds of a corn plant are the kernels that you find on an ear of corn. The kernels are arranged in rows along the ear. An ear of corn may have as few as eight or as many as 36 rows, but the number of rows is always even.

Corn is the number one crop grown in Illinois. When corn is harvested, about 60 percent of it is fed to livestock and 25 percent is exported. Corn also has industrial uses such as ethanol, degradable plastics, and starch for recycled paper. Ethanol is a motor fuel that contains nearly twice as much oxygen as any other gasoline additive. This means that ethanol burns cleaner and more efficiently. Ethanol is made from the starch portion of a kernel of corn.

Corn can also be processed into foods such as cereal, bread, ketchup, soda pop, corn syrup, peanut butter, corn oil, corn meal, flour, and pickle sweetener. Many soft drink manufacturers now use corn sweeteners to replace part of the sugar in their products. Corn derived sweeteners and syrups are also used in baked goods, canned foods, candies, ice cream, and other dairy products. More than 2400 products in a typical supermarket contain some product or byproduct of corn. Corn provides our bodies with complex carbohydrates, fiber, B-vitamins, and potassium.

Trade and marketing are necessary to American agriculture. The United States exports agricultural products, such as corn, around the world to countries that cannot grow livestock

and crops as efficiently as the American farmers do. The U.S. also exports to countries that cannot grow agricultural products at all because of their climate. The United States imports products, some agricultural, from other countries that produce different, less expensive, or better quality goods.

Agriculture is extremely affected by the economic concepts of supply and demand. When crops are available in big quantities and product demand is low, the price people are willing to pay goes down. When a small amount of crops are available and people want to buy large quantities, the price goes up.

To keep the price of a commodity such as corn as high as possible, producers need to regulate the size of their crop and encourage scientific research to create new uses for their product. This way the demand is high and the supply meets but does not exceed the need.

Materials Needed:

- "Corny Math Facts" worksheet for each student

Activity Outline:

1. Have a class discussion on corn facts and stress vocabulary words such as seed, bushel, yield, ethanol, livestock, and carbohydrates.
2. Explain supply and demand to the students. Discuss how supply and demand affect prices of crops.
3. Ask students to complete the "Corny Math Facts" worksheet. You may choose to have students work in cooperative groups.
4. Discuss the results.

Discussion Questions:

1. What unit of measurement is used for measuring corn? (bushel)
2. What is supply?
3. What is demand?
4. If there is too much corn, are prices high or low?
5. If there is not enough corn, are prices high or low?

Related Activities:

1. Contact Illinois Corn Growers Association at P.O. Box 1623, Bloomington, IL 61702 to find out more information on corn.
2. Ask students to write their own problems using corn facts.
3. Ask a farmer to visit your classroom to discuss corn production.
4. Plant corn seeds and keep an observation journal.
5. The Illinois Farm Bureau® Ag in the Classroom program has developed a colorful educational magazine called *Ag Mag* 11 that offers additional interesting and fun information about corn. Please call your county Farm Bureau® to find out how you can receive copies to use in your classroom.

To be used with:
Corny Math Facts

Name _____

Corny Math Facts

Answer the following math story problems.

1. One year there was an abundance of corn in Illinois. Since there was more corn than the people needed, do you think the price of corn went up or down? Why?

2. When would the price of corn be high?

3. A corn plant can grow 7 to 10 feet tall. Do corn plants grow taller than you?

4. One bushel of corn can sweeten 413 cans of soda. Is 413 greater or less than 100?

5. Circle the odd numbers below.

5 8 6 12 21 26 33 36 45

6. Kernels grow in rows on ears of corn. An ear of corn may have 8-36 rows and the number of rows are always even. Circle the numbers that are possible numbers of rows.

14 17 37 4 32 26 5 102

7. 4,800,000 bushels of corn were fed to livestock in 1993. How many "0s" are in 4,800,000?

8. The average American will eat 45 acres of corn in his/her lifetime. Is 45 greater or less than 50?

9. Pretend you are making cornbread. If you have 3 cups of cornmeal in separate cups and one cup spills on the floor, how many are still usable?

Corny Math Facts

1. *The price of corn went down. Since there was a lot of corn available, there was too much corn to go around. This causes the price to go down so people will buy the corn and use it in various ways.*

2. *The price of corn would be high when there is not enough corn to meet the amount needed by people and industry.*

3. *Yes, corn plants grow taller.*

4. *Greater*

5. (5) 8 6 12 (21) 26 (33) 36 (45)

6. (14) 17 37 4 (32) (26) 5 102

7. *There are 5 "0s" in 4,800,000.*

8. *Less than*

9. *2 cups*

The Weights of Farming

Grade Level: K-3

Approximate Length of Activity: 45 minutes

Objectives:

Teacher:

1. Acquaint students with use of math and measurements throughout the occupation of farming.
2. Provide students a hands-on experience with weights and measurements used in farming.

Students:

1. Understand why farmers need to be mathematicians.
2. Develop an awareness that farmers use a variety of weights and measurements.
3. Experiment and estimate the measurement of a bushel.

Illinois Learning Standards: 7.B.1a; 7.B.1b

Introduction:

The teacher should be prepared by knowing common systems of weights and measures. A chart is included to help review this information.

Many occupations require an understanding of weights and measures, especially agricultural occupations. For instance, a farmer must be a good mathematician. There are many reasons and ways to use common weights to accurately weigh, market, and buy resource materials needed to carry out the farming operation. Farmers produce their crops on an acre of ground. An acre is about the size of a football field. In Illinois, the average size farm is 400 acres. An acre of corn will produce about 130 bushels of corn. One bushel of corn weighs 56 pounds. An acre of soybeans will yield about 40 bushels. Each bushel of soybeans weighs 62 pounds. Knowing how many acres will be used to produce a crop, a farmer can calculate how many pounds of seed and fertilizer, and how many gallons of chemicals he/she will need to purchase.

The students will gain an awareness and appreciation of weights and measures by actually practicing to fill a container—a bushel—with various materials. This activity would be greatly enhanced by following up with speakers on the weights used in a farming operation. Also, appropriate field trips can be beneficial to the clarity of the information regarding measurement.

Materials Needed:

- Bushel basket (may be obtained from a produce or flower market)
- Shoes of the students in the class (have a few extra shoes available)
- Packing peanuts

Activity Outline:

1. Estimate the number of students' shoes that are needed to fill the bushel basket. Keep a chart of the numbers, recording the estimate and the accurate answer.
2. Ask all students to take off their shoes and place as many as necessary in a bushel basket until the basket appears to be full.
3. Take out the shoes and get an accurate count of the number of shoes that were needed to fill the basket.
4. Repeat steps 1-3, only this time using packing peanuts. Record the estimate and the accurately counted answer.
5. Do the students understand how much a bushel is? Compare a bushel to other measurements by asking questions such as: "Is a bushel larger or smaller than a pint?" and "Is a bushel larger or smaller than a gallon?"
6. Describe to students the number of different types of measurements farmers need to use every day to carry out their occupation. Have students compare their activity to various jobs a farmer does.
7. Have a farmer, seed dealer, or an agricultural engineer visit the class. Have them talk to the students about their job and how they use math in their job.

Discussion Questions:

1. Why do farmers need to know much about the measurement of an acre?
2. In what ways do farmers use different types of weights and measures?
3. Would the same amount of feathers fill a bushel basket as apples needed to fill a bushel basket?
4. What did the guest speaker say he or she did in their job?
5. How do they use math in their job?
6. Why is their job important to agriculture?

Related Activities:

1. Invite a farm service professional and grain elevator operator to the classroom to discuss the uses of weights and measures in their jobs.
2. Organize a field trip to any agricultural business to allow students to observe the use of weights in everyday agricultural activities.

To be used with:
The Weights of Farming

For Teacher Use

U.S. Standard Weights & Measures

Liquid Capacity

2 cups	= 1 pint
2 pints	= 1 quart
4 quarts	= 1 gallon
3 gallons	= 1 barrel liquid
42 gallons	= 1 barrel of petroleum

Dry Capacity

2 pints	= 1 quart
8 quarts	= 1 peck
4 peck	= 1 bushel

Weight & Mass

1 pound	= 16 ounces
8.34 pounds	= 1 gallon water

Distance

1 foot	= 12 inches
1 yard	= 3 feet
1 rod	= 5.5 yards
1 mile	= 5,280 feet
1 mile	= 1,760 yards

Area

1 square foot	= 144 square inches
1 square yard	= 9 square feet
1 square rod	= 30.5 square yards
1 acre	= 4,840 square yards
1 square mile	= 640 acres

Pumpkins with Personality

Grade Level: K-3

Approximate Length of Activity: One hour

Objectives:

Teacher:

1. Teach students about pumpkin production by reading a book and explaining the process.
2. Give students an understanding of guesses, estimates, and actual numbers through a pumpkin seed math activity.
3. Help students choose and identify shapes for Jack-O-Lanterns.

Students:

1. Show understanding of a guess, an estimate, and an actual number by assigning numbers to amounts of pumpkin seeds.
2. Select shapes to use for Jack-O-Lanterns and name them.
3. Learn how pumpkins are produced and explain the process.

Illinois Learning Standards: 7.B.1a; 7.B.1b; 9.A.1a; 9.A.1b

Introduction:

Illinois is the leading state in the production of pumpkins. We grow enough pumpkins each year to make 16.6 million Jack-O-Lanterns. There are 448 pumpkin farms in Illinois that use 8,297 acres of land for pumpkin production. Some pumpkin growers in Illinois sell their pumpkins at stores near their homes. Their pumpkin farm becomes a harvest festival as visitors pick pumpkins, drink apple cider, purchase crafts, and take hayrack rides.

Pumpkins should not be planted until the soil is warm and all danger of frost or severe chilling is past. It takes 110 days, or almost four months, for a pumpkin vine to produce mature pumpkins. Timing is very important because pumpkins are frost-sensitive plants. Seeds should be planted four feet apart, allowing six feet of space between rows, to give them plenty of room to grow. Two to three pumpkins grow on a vine, and each vine may reach 15-20 feet in length. Not every seed will develop, so extra seeds need to be planted. Pumpkins need special nutrients from the soil, lots of sunshine and rain, and proper soil and air temperature to grow. Pumpkins are pollinated by bees. The size of a pumpkin depends on water, temperature, insects, diseases, pollination, fertility, soil type, plant population, and weeds.

Pumpkins are picked by hand when they are a deep, solid color and the rind is hard. Pumpkin producers must find a market for their crop. They can sell pumpkins at their home, at a market, to a store, or to a processing plant. Pumpkins should be stored in a cool, dry place to keep from rotting. They are used to make pumpkin butter, pies, custard, bread, cookies, and even soup!

Materials Needed:

- *The Pumpkin Patch*, by Elizabeth King
- One large pumpkin
- Knife
- Small bowls
- Orange construction paper
- Scale (to weigh pumpkin)

Activity Outline:

1. Show your class a pumpkin and talk to them about how they grow. You may want to read *The Pumpkin Patch*, by Elizabeth King.
2. Ask the students how much they think the pumpkin weighs. Weigh the pumpkin and discuss the term "pound."
3. Tell students that a pumpkin weighing 1,092 pounds holds the world's record for weight.
4. Cut the top off the pumpkin and show students the pulp and seeds.
5. Ask the students to guess how many seeds are in the pumpkin and record their guesses on a chart.
6. Scoop the pulp and seeds out of the pumpkin and give some to each student in a bowl. Let them find the seeds in the pulp. Ask the students to count how many pumpkin seeds were in the pulp they were given and then add all of the numbers together to find the total amount of seeds in the pumpkin. Talk about the difference between a guess (before the pumpkin was opened) and an actual amount.
7. Ask the students if they have ever carved a Jack-O-Lantern and talk about how to make one.
8. Give each student a piece of orange construction paper. Tell them to draw a picture of a pumpkin, draw basic shapes (circles, squares, triangles, rectangles, ovals, and any other shapes the students have learned) for the features, and cut out the shapes. Walk around the room, helping the students and talking with them about the shapes they chose to use.
9. Hang the pumpkins from the ceiling or on a bulletin board.
10. Draw a student's name from a hat and show the class their construction paper pumpkin. Tell the students that you will carve the real pumpkin like that student's pumpkin.
11. As you carve the pumpkin, talk with the students about the shapes you are using.

Discussion Questions:

1. What do pumpkins need to grow?
2. How are pumpkins harvested and what are they used for?
3. What is the difference between a guess, an estimate, and an actual number?

Related Activities:

1. Bake your pumpkin seeds by rinsing them, spreading them on a baking sheet, applying salt, and baking them in a 300° oven for 30 to 40 minutes. Stir every 5-10 minutes, or until golden brown. Remove from oven and salt to taste.
2. Play "Ring a Hula Hoop Around a Pumpkin." Paint point values on the pumpkins such as 10, 20, 30 and 40. Arrange the pumpkins with the highest score farthest from the starting line. Players stand in line and try to toss a hula hoop around a pumpkin. Each child gets three tosses, and the child with the most points wins!
3. Garnish pumpkins with sticks, leaves, seeds, pine cones, gourds, cloves, corn kernels, orange rinds, and other items to create a fall decoration.
4. Set pumpkins where students can see them. Ask the students to describe the pumpkins.
5. Bring a scale to your classroom and let the students weigh pumpkins. Talk about what a pound is. Do the pumpkins weigh more or less than the students?

Other Resources:

The Illinois Farm Bureau® Ag in the Classroom program has developed a colorful educational magazine called the *Ag Mag* 9 that offers additional interesting and fun information about pumpkins. Please call your county Farm Bureau® about receiving copies to use in your classroom.

Soil – We Can't Live Without It

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Help students understand soil—what it is made of, the layers, and the nutrients in soil.
2. Help students understand which types of soil are best for growing plants.
3. Have students work cooperatively together.

Students:

1. Observe and identify various types of soils that have been collected.
2. Know the three layers of soil.
3. Learn that different soil types are suitable for different crops.
4. Work cooperatively with other students.

Illinois Learning Standards: 10.A.1a; 12.C.1b; 12.E.1c

Introduction:

One of the most important natural resources on earth is the soil. Many living things depend upon it either directly or indirectly for a source of food. The amount of food-producing land dwindles as the world's population continues to grow. The farmers have to produce as much food as possible on every square foot available. In order to do this they have to have good, nutrient-rich soil.

There are three main layers of soil. The bedrock layer is the bottom layer, which is about three feet below the surface and has large rocks in it. The subsoil layer is about one foot below the surface. Tree roots and earthworms live here. The topsoil is where the plants grow. This is the layer that must be protected. It is the responsibility of each generation to use the soil wisely. Farmers often have their soil tested to make sure it has the right nutrients. Also, the type of soil a farmer has determines which types of crops can be raised.

Soil is made up of four parts: air, water, minerals, and organic matter. Air and water provide nutrients to the plant so the plant can make food for itself. Organic matter, also known as humus, is made of plant and animal remains in various stages of decay. Minerals are the clay, sand, and silt particles. The mineral content determines the soil type. Sandy soil has mostly sand and no organic matter. Sand is the largest of the soil particles, feels gritty, is the heaviest, and allows water and air to move easily through it. Clay soil has mostly clay, a little

organic matter, and sand. Clay particles are very fine and are the smallest of the three soil particles. Clay is sticky when wet and hard and brick-like when dry. Silt is the soil particle that falls between sand and clay in texture; it is considered a medium-sized soil particle. It feels like flour and is very smooth when you rub it in your hands. Silt particles keep the soil rich and loose.

Materials Needed:

- Clay
- Sand
- Potting Soil
- Hand-held magnifying lenses
- Clear plastic cups for planting
- Cups for edible soil
- Corn or soybean seeds (Contact your county Farm Bureau®)
- Measuring spoons
- Water
- Large bowls for mixing pudding and crushing cookies
- 1 large package chocolate creme sandwich cookies
- 3/4 lb. package gummi worms
- 1 package miniature chocolate chips
- 4 tablespoons margarine
- 1 8-oz. package cream cheese
- 1 cup powdered sugar
- 3 1/2 cups milk
- 2 3-oz. packages vanilla instant pudding
- 12 oz. container of whip cream

Activity Outline:

1. Ask each student to bring in about two cups of soil from home in a resealable plastic bag.
2. When soil is brought in, have the students compare the soil samples. Discuss the various colors and textures between each of the samples. Also discuss where each student got his or her sample. (From a garden, from the yard, etc.)
3. Discuss how soil is made up of four parts: air, water, minerals, and organic matter (or humus). Also discuss the three layers of soil – bedrock, subsoil, and topsoil.
4. Have the students use a hand magnifying glass to examine different types of soil (sand, silt, and clay) and compare the visual differences. The teacher may want to list the characteristics of all three on the chalkboard.

5. For this next part you will be using clay soil, sandy soil, and potting soil. As a class you will be planting soybean or corn seeds in three different soil types to determine which soil is the best to grow plants. Discuss with the students that potting soil is a mixture of all soil types with some humus also added to it.
   a. Place some clay soil in one clear, plastic cup. Put some sandy soil in another and potting soil in the third cup. Label each cup with the types of soil it has in it.
   b. Place two soybean seeds in each cup. Cover with the appropriate soil type.
   c. Give each cup a little amount of water. Place each cup next to one another on a window sill.
6. As a class, record the growth of the soybean seeds in each type of soil. After one-and-a-half to two weeks, see which plant has grown the most.
7. As a final activity to this lesson, make edible soil. As the mixture is put into their cups, talk about each layer and relate that to the actual layer of soil.
   a. Crush and set aside one large package of the cookies.
   b. Cream together four tablespoons margarine, one 8-oz. pkg. cream cheese, and one cup powdered sugar.
   c. Mix together three and one half cups milk, two 3-oz. pkg. vanilla instant pudding. Mix well.
   d. Bedrock: Begin with a layer of crushed cookies. Then mix chocolate chips with half of the creamed pudding mixture and smooth it over the cookies.
   e. Subsoil: Add more crushed cookies, then a creamed pudding layer and gummi worms. (Save one worm for the top layer.)
   f. Finish with a layer of crushed cookies. Poke a gummi worm through the top to peek out of your "soil."

Discussion Questions:

1. What type of soil allows water to run quickly through it?
2. What type of soil is sticky when wet and hard, brick-like when dry?
3. What is humus or organic matter? How does it benefit the soil or the plants?
4. Compare and contrast all three types of plant growth. Which soil was the worst for growing plants? Why? Which soil was the best? Why?
5. What did the three layers of the "Edible Soil" represent?

Related Activities:

1. Learn about how soil is tested for nutrients.
2. Learn about the importance of earthworms to a field. (One acre (43,560 square feet) of moist loam soil may be home to over a million earthworms. Those earthworms weigh more than 1000 pounds total.)
3. Invite a professional from your county Soil and Water Conservation District to talk about careers.

Other Resources:

Ag Mag 1 and 3, produced by Illinois Farm Bureau®

What Grows up? What Grows Down?

Grade Level: K-3

Approximate Length of Activity: One class period, plus a few minutes each day to record plant growth

Objectives:

Teacher:

1. Provide students an opportunity to discover how gravity and sunlight affect plants.
2. Lead students in an experiment.

Students:

1. Discover how gravity and sunlight affect plants.
2. Conduct an experiment, record data, and interpret results.

Illinois Learning Standards: 11.A.1a; 11.A.1b; 12.A.1a; 12.B.1b; 12.C.1a; 12.D.1b; 13.A.1c

Introduction:

There are at least 260,000 species of plants in the world. They grow everywhere except areas which have permanent ice. Plants are beneficial to us because they give us oxygen, shelter, food, fiber, and many other products. Seeds that grow the plants need warmth, moisture, and oxygen to grow. Most seeds grow best between 65°F and 85°F. Seeds receive their moisture from the ground. This moisture softens the seed coat and the growing parts are able to break through. A seed will rot if it receives too much water. A seed will germinate slowly or not germinate if it receives too little water. Oxygen is also used to help the plants grow.

Plants will grow under poor conditions, such as cool temperatures, lack of moisture, and lack of oxygen, but the plants may not be as healthy or as productive as those grown under optimum conditions. The growing environment for plants can be improved by irrigating, fertilizing the soil, planting crops during warm seasons, and planting crops that are compatible to the soil and environment. In this activity, students will set up a science area to grow beans under a variety of conditions and then chart the effects of the environment. Students will be able to see which way a plant's stem and roots grow and learn why.

There are many environmental factors that affect the growth of plants. Climate, sunlight, water, and nutrients all affect the life of a plant. These same factors also affect humans. We depend upon water and nutrients to stay alive, sunlight to give us light for day and to see

better. The climate we live in helps us determine what to wear and what to do.

Sunlight and gravity affect the direction a plant will grow. Normally a plant's roots will grow down towards the ground because of gravity, and a plant's stem will grow up towards sunlight. This is called a tropism.

Materials Needed:

(Per Student)

- "My Soybean Growth" worksheet
- Soybean seeds
- Soil
- Water
- Clear plastic cup

Activity Outline:

1. Each student should write his or her name on the bottom of a plastic cup. Then fill the clear cup about half full of soil.
2. Slide one or two soybean seeds into the cup so the seed(s) is between the soil and side of the cup.
3. Add a little water to the cup. Make sure students don't add too much.
4. Place the cups in the upright position in a sunny spot.
5. Have the students keep a record of what occurs each day on "My Soybean Growth" sheets. Did the seed(s) sprout? Did the stems start growing? Did the roots start growing?
6. After a few days of growth, show the students the parts of the plant: the seed (if still there), the roots, and the stem.
7. Have students water daily and keep track of any changes for a week. (If leaves begin to grow teach the students what they are, also.)

Discussion Questions:

1. What happened to the seed? (It grew into a plant?)
2. Which way did the stem grow?
3. Which way did the roots grow?
4. What color is your plant? Is this a healthy color?
5. What types of environmental factors affect plant growth?

Related Activities:

1. Conduct alternate experiments with different types of seeds to see how each plant grows differently.
2. Plant the germinated seeds in a bigger pot, in the soil, and see the plant continue to grow.

To be used with:
What Grows Up? What Grows Down?

Name _____

My Soybean Growth

After you plant your bean seed, write what happens on this chart.

Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	

Milk on the Moo-ve

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Develop awareness of how advanced technology has improved the versatility of agriculture products.
2. Analyze information and draw conclusions.

Students:

1. Learn that technology has improved the use of milk.
2. List the advantages and disadvantages of dry milk.
3. List the advantages and disadvantages of liquid milk.

Illinois Learning Standards: 12.C.1b; 13.B.1d

Introduction:

Through product technology the useability of milk has been improved. In liquid form, milk can be stored in a refrigerator for several days. Milk, in powder form (also known as dry milk), is made by removing fat and water. It has Vitamins A and D added to it and has a longer shelf life than liquid milk. Nonfat dry milk does not need to be refrigerated when stored in the powder form.

There are many types of lactose-free dairy products available at the grocery store nowadays. Lactose free dairy products are made possible by altering a bacterium used to make cheese and yogurt. This alteration produces an enzyme that breaks down the milk's lactose. This allows many dairy products to be available in lactose-free versions for people who are lactose intolerant.

Scientists have been researching ways to invent frozen milk. Concentrated frozen milk has been tried many times before but has not been successful. Because milk contains butterfat, once it is frozen, the butterfat causes problems for the milk to go back to its liquid form. Now scientists are working to move past this problem so that frozen milk will be an option in the future.

Through the use of technology, milk production has been increasing for more than 25 years in the United States. In 1960, the U.S. produced 123,109 million pounds of milk. By 1998, the U.S. increased its milk production to 157,441 million pounds per year. Continuing research and advances in technology help the U.S. to produce more milk year after year. This is a significant achievement, especially since the number of dairy cows available to produce milk decline each year.

Materials Needed:

- Small carton of liquid milk
- Box of nonfat dry milk

Activity Outline:

1. Begin a discussion of milk by asking where milk comes from, if it is a solid or a liquid, what kinds of containers it comes in, if it always has to be kept cool, etc.
2. Show a box of nonfat dry milk. Read the pertinent information on the box.
3. Explain that through technology, powdered milk was milk that had the water and fat removed, making the shelf life longer than fresh milk.
4. Make some milk from powder. Have the students compare the taste of fresh milk and milk made from powder.
5. As a class list ways that powdered milk could be used.
6. List the advantages and disadvantages of liquid milk.
7. List the advantages and disadvantages of dry milk.

Discussion Questions:

1. When would you use fresh milk?
2. When would you use nonfat dry milk?
3. Which kind of milk would you recommend? Why?
4. What did you learn about the uses of powdered milk?

Related Activities:

1. Contact the American Dairy Association, #1 West Front Street, El Paso, IL 61738, for more dairy information.
2. In a science corner, pour a glass of fresh milk. Pour powdered milk in another glass (no water added). Check for freshness each day.
3. Try a recipe using nonfat milk. (No-bake cookies and hot chocolate mix often use powdered milk.)
4. Do a price comparison of fresh and powdered milk.
5. Incorporate a unit on dairy farming.
6. Study the food pyramid.

Better Butter

Grade Level: K-3

Approximate Length of Activity: 30 minutes

Objectives:

Teacher:

Have children see a natural food source, such as whipped cream, processed into a topping for food, such as butter.

Students:

Observe the process of changing one food form to another, such as a liquid to a solid.

Illinois Learning Standards: 11.A.1a; 12.C.1b; 13.B.1c; 13.B.1d

Introduction:

With just about 1650 dairy farms in Illinois, 122,000 cows provide many dairy products for us to eat. Milk, cheese, yogurt, ice cream, and cottage cheese are items to choose from to get the two to three recommended daily servings of dairy products.

Butter is made from butterfat from the cream and milk of dairy cows. After cows are milked, the milk travels to a refrigerated tank through pipes. An insulated truck comes to the farm and hauls the milk to a dairy plant. After the milk is tested for safety, it is homogenized, pasteurized, and packaged. Milk can also be made into butter, cheese, yogurt, ice cream, or other dairy products. Milk products are stored in a refrigerated room and are then taken to a grocery store for you! Some countries use the butterfat from goats, horses, reindeer, sheep, and other animals to make butter.

Butter used to be made by putting cream into a butter churn. Butter churns were big containers with a pole in the middle. People pulled the pole up and down to churn the cream into butter. Nowadays butter can be made by using various machines. First, cream is pasteurized to kill bacteria and prevent spoilage. Next, the cream is churned, or mixed. Finally, the butter is packaged. Butter is about 80 percent butterfat, 16 percent water, three percent salt, and one percent curd of milk. Products such as butter oil, whipped butter, and cooking oil can be made from butter.

Historians are not sure when butter was first made, but they do know that it was made from water buffalo milk as early as 2000 B.C. The first creamery to make high amounts of butter was in Orange County, New York, in 1856. The use of butter was at its highest during the 1920s and 1930s, before margarine became a popular substitute. The average American today consumes four pounds of butter each year.

Materials Needed:

- Liquid whipping cream
- Clean baby food jars (one per group)

Activity Outline:

1. Talk about where milk comes from and how milk is made into many products, such as butter.
2. Go through the safety procedures and importance of cleanliness with students.
3. Group children into twos or fours.
4. Discuss the whipping cream in its liquid form and let the children know that a change will be taking place with the whipping cream.
5. Pour whipping cream into baby food jars until half full.
6. Let the students screw on lids. Before shaking, the teacher should check to make sure the lids are securely closed.
7. Have the children take turns shaking the jar to "churn" the cream. Have them shake the jars until they can no longer hear the liquid moving. The teacher should check the jars to see if the cream has separated into milky liquid and creamy solid butter.
8. Help the children carefully pour off the liquid. Serve their homemade butter on bread or crackers.

Discussion Questions:

1. Where does milk come from?
2. What other products can be made from the milk/or what other foods have milk in them?
3. Are there other ways of changing food into a different kind?

Related Activities:

1. Included in this lesson are three handouts/worksheets entitled "Cows Make Milk for You and Me," "From Farm to You," and "From Farm to You Activities," from the American Dairy Association of Illinois. You may copy the pages for use in your classroom.
2. Compare the taste and color of purchased butter, which has salt and sometimes food coloring added, to "better butter."
3. Show pictures of old churns and new ones.
4. Create a hands-on unit based on dairy products.
5. Teach a lesson about cows and how they can turn grass into an edible product for humans. Cows have four stomachs to help them digest foods we cannot.

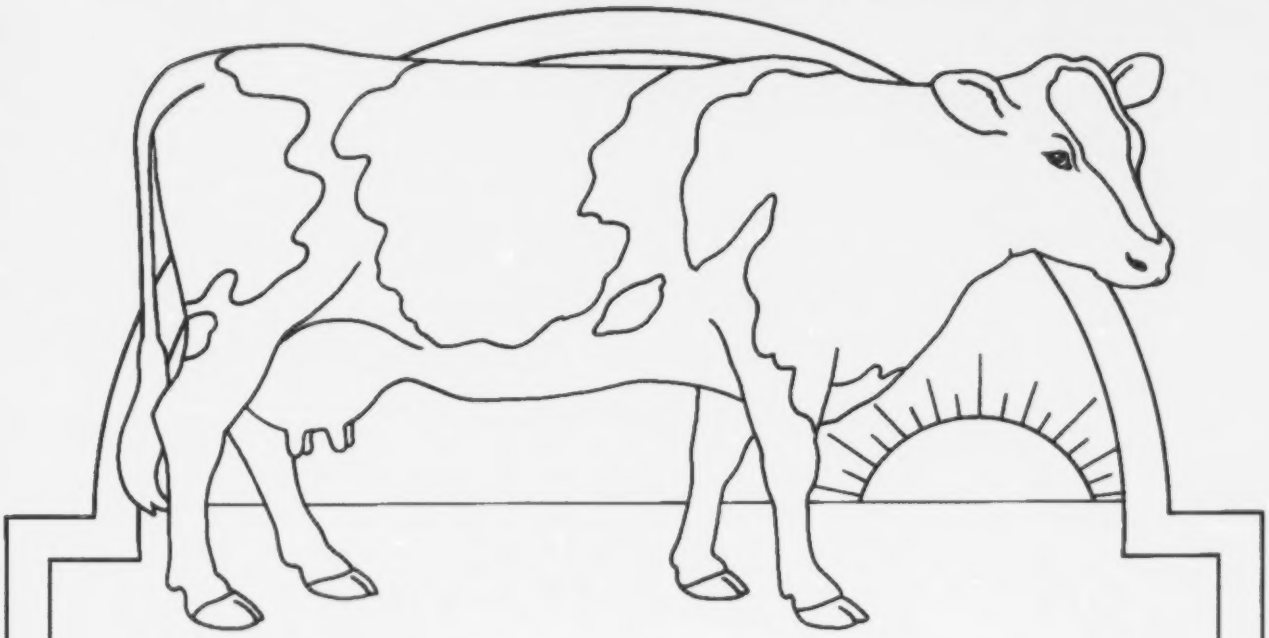
Other Resources:

1. *Dairy Foods Fun Book, Swiss Valley Farms*. Wisconsin Milk Marketing Board, Inc. 8418 Excelsior Drive, Madison, Wisconsin 53717. (10 cents each.)
2. *The Calcium Story*, American Dairy Association of Illinois, 1 West Front Street, El Paso, IL 61738. (Free if stated use for in class.)

To be used with:
Better Butter

Name: _____

Cows Make Milk For You and Me



When a cow is born it is called a calf.

A calf weighs about 100 pounds.

A cow weighs about 1500 pounds.

Cows come in all colors: red and white, red, black and white, brown, brown and white, and golden brown.

The black and white cows are called Holsteins.

A cow eats 90 pounds of food each day.

A cow drinks 25 to 50 gallons of water each day.

A cow makes milk from food and water she eats.

A cow gives 100 glasses of milk each day.

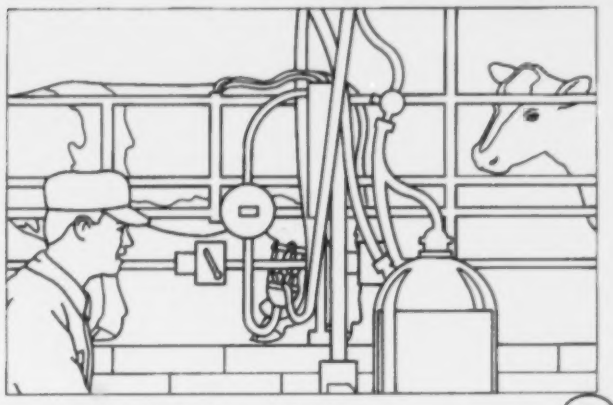
American Dairy Association of Illinois
One West Front Street
El Paso, Illinois 61738
Telephone: 309/527-4095

To be used with:
Better Butter

Name: _____

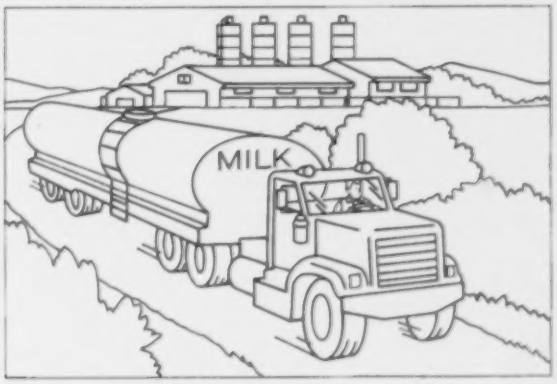
From Farm to You

1



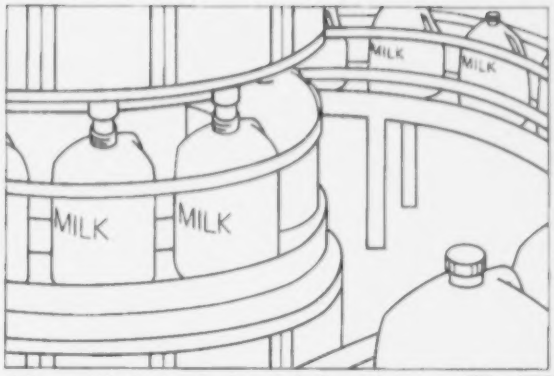
The cow is being milked.

2



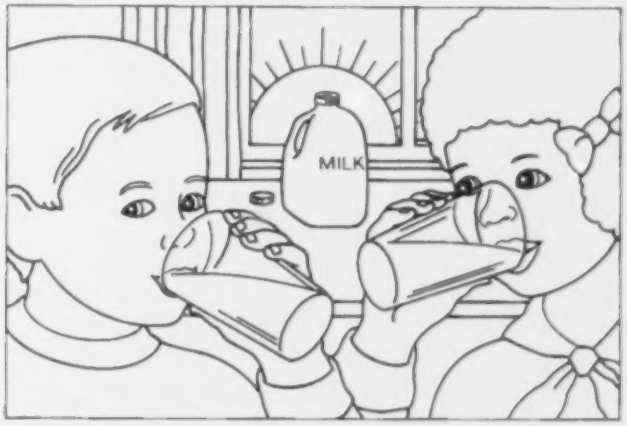
A truck takes the milk from the farm to the dairy plant.

3



The milk is heated, cooled and placed in containers at the dairy plant.

4



Now, the milk is ready for you to drink. Drink 3 glasses of milk every day.

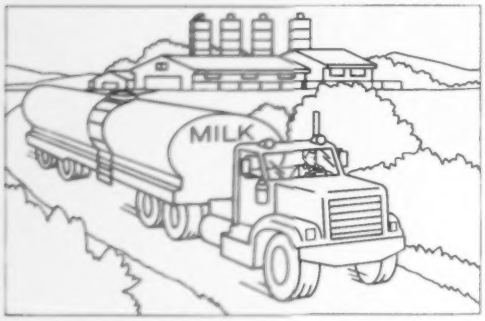
American Dairy Association of Illinois
One West Front Street
El Paso, Illinois 61738
Telephone: 309/527-4095

To be used with:
Better Butter

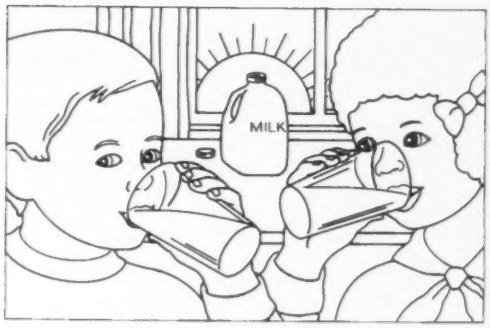
Name: _____

From Farm to You Activities

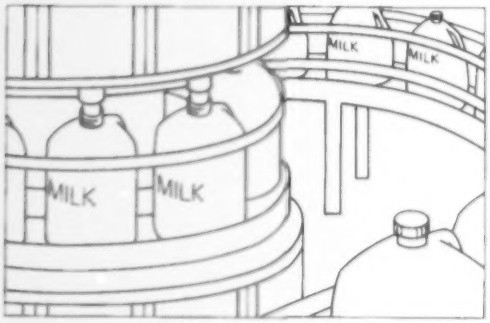
How do you get milk to drink?
Number the pictures in order 1, 2, 3, and 4.



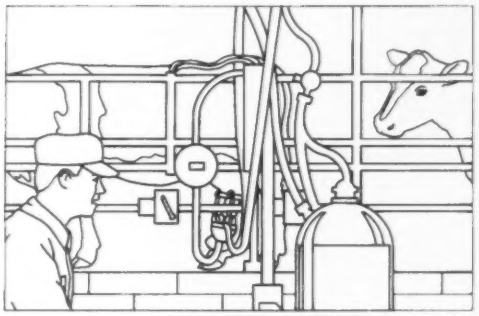
From farm to dairy plant



Milk for you



Dairy plant



Milking

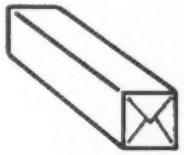
These foods are made from milk. Fill in the vowels to name the foods.

ch__s_

c_tt_g_
ch__s_

y_g_rt

_c_
cr__m



b_tt_r

American Dairy Association of Illinois
One West Front Street
El Paso, Illinois 61738
Telephone: 309/527-4095

Those Amazing Earthworms

Grade Level: K-3

Approximate Length of Activity: 20 minutes, plus time three days later

Objectives:

Teacher:

Help students learn about cycles in nature.

Students:

1. Observe earthworms and learn how they are beneficial to our environment.
2. Identify and describe several characteristics of earthworms.

Illinois Learning Standards: 11.A.1a; 12.A.1b; 12.B.1a; 12.B.1b

Introduction:

Earthworms live in warm, moist soil throughout the world. Earthworms can be found in many different sizes. The smallest earthworm can be only one millimeter long and the longest can be 11 feet long!

Earthworms are great recyclers because they take food scraps and other decaying matter in the soil and turn it into nutrients for plants. Whether it is humus (dead plant material) or food scraps, earthworms will eat all kinds of things that are soft to chew. This earthworm "food" is digested and then excreted back into the soil in a nutrient-rich matter. These nutrients are great for the soil and enable the plants to grow.

Earthworms also dig through soil and mix it up. Particles called sands, silts, and clays make up most of the mineral content of soils. As earthworms dig, they loosen up the soil and mix different types of soil so plants have a better environment to grow in. Earthworms also provide air passages for soil, which help plants grow. Other organisms found in soil include plant roots, insects, and small mammals.

Materials Needed:

- Two jars
- Lids with holes
- Dark soil
- Sandy soil (bright color)
- Two earthworms
- Carrot scraps
- Dark paper (two pieces)
- Masking tape
- Water

Activity Outline:

1. In the bottom of each jar, put a layer of dark soil about one inch thick. On top of this, place a one-inch thick layer of light sandy soil. Keep adding dark, then light layers until the jar is half full.
2. Slightly moisten the soil in both jars with water.
3. Place the two earthworms in *one* jar, and then add some carrot scraps to both jars.
4. Put a lid on each jar. Label the jar with earthworms as "Earthworms" and label the other jar "No Earthworms."
5. Take the dark pieces of paper and wrap around each jar. Tape tightly. Put the jars aside.
6. Have each student write down their predictions about what they think will happen in each jar.
7. After three days unwrap the jars. See what has happened!

Discussion Questions:

1. Which jar contained earthworms? Describe the soil in each jar.
2. Which jar do you think is a better place for a plant to grow? Why?

Related Activities:

1. Keep putting food scraps in the jar with the earthworms and continue a month long observation.
2. The class could make a compost bin and put earthworms in it, then observe what happens.

How Does Your Garden Grow?

Grade Level: K-3

Approximate Length of Activity: 4 days – 30 minutes each day

Objectives:

Teacher:

1. Acquaint students with a real plant and an artificial plant.
2. Show the students the different parts of a real plant.

Students:

1. Explain the difference between a real plant and an artificial plant.
2. State what plants need to live and grow.
3. Identify the different parts of a plant (roots, stem, leaves, seeds/fruit).

Illinois Learning Standards: 12.A.1a; 13.A.1a; 13.A.1c

Introduction:

Gardening is the cultivation of plants, usually in or near the home, as a hobby. Gardening is closely related to horticulture. Horticulture is the growth of fruits, vegetables, flowers, shrubs, grass, and trees. Plants are made up of roots, stems, and leaves. The roots of a plant help to anchor the plant in the soil. They also absorb water and minerals from the soil to provide the plant with nutrients to grow. Stems of plants are various shapes and sizes. Twigs, branches, and trunks are all stems of plants. Some stems grow partly underground, but most stems grow above ground. Stems support the leaves and flowers of plants so they can receive an adequate amount of sunlight. Leaves of plants have the very important job of providing food for the plant. The leaves need sunlight, which provides energy, to combine carbon dioxide, water, and minerals to make food for the plant. This process is called photosynthesis.

Plants are very important to all living things. Plants provide us with oxygen to breathe, food to eat, and clothes to wear. Some plants also provide us with wood to build homes and many other things.

We get food from many different parts of the plant. Some plants such as carrots and sweet potatoes are actually the roots of the plant. Corn, soybeans, and wheat are seeds of the plant. These three types of seeds provide us with many types of foods and other products. We eat the leaves of plants when we eat lettuce and celery. Broccoli and cauliflower are actually the flower buds of plants. Then oranges, bananas, and apples are the fruits of certain plants.

Plants also provide us with clothing, wood, and medicine. Cotton plants provide us with cotton for many types of material products such as clothing, sheets, and curtains. Trees provide us with lumber so we can make paper, furniture, and most importantly, houses. Wood is also used in various parts of the world for people to burn so they have heat to cook food or to heat their home. Plants also provide us with quinine, digitalis, and cortisone medicines to help treat human diseases and conditions.

Materials Needed:

- "My Plant Journal" worksheet
- *Jack's Garden* by Henry Cole
- A live plant
- An artificial plant
- Seeds (soybeans, corn, radishes, or lettuce)
- Soil
- Plastic cups
- Water
- Sock
- Paper
- Glue
- Marker
- Paper Baking Cups
- Chalk/Chalkboard
- Egg Cartons
- Tape
- Microscope

Activity Outline:

Activity 1: Reading Books

1. Read the book *Jack's Garden* by Henry Cole.
2. Encourage students to read books about seeds and plants. Some suggestions for reading are:
    a. *From Seed to Plant* by Gail Gibbons
    b. *The Tiny Seed* by Eric Carle
    c. *The Reason for a Flower* by Ruth Heller
    d. *Anna's Garden Songs* by Mary Steele
    e. *Jack and the Beanstalk* by Susan Pearson
    f. *How a Seed Grows* by Helene J. Jordan

Activity 2: Are Seeds Living Things?

1. Put some soil in a cup. Use clear plastic cups so students can see the roots growing.

2. Place seeds in the soil. Soybeans, corn, radishes, marigolds, and lettuce grow easily and quickly.
3. Label each cup.
4. Water the seeds. Do not overwater or underwater seeds.
5. Discuss what helps plants grow.
6. Have students complete the beginning of their journals and then record daily observations. Answer Key: My seeds need water, air, soil, and sunlight to grow.

Activity 3: Stepping Into Seed Collecting

1. Ask students to bring in adult socks that can be slipped over their shoes.
2. Take students for a walk through a field or weedy area. Seeds, burs, stickers, and weeds of all kinds will stick to the socks.
3. Back in the classroom, have students carefully remove the items they carried inside on their socks. If desired, have students place their collections in paper baking cups.
4. After discussing the types of seeds that were collected, ask students to brainstorm where their collections might have originally come from.
5. Then have each child glue or tape one seed onto a sheet of paper. Write and illustrate a story as if he/she were the seed.

Activity 4: Taking a Closer Look

1. In a safe location, display a microscope and a variety of seeds.
2. Ask students to bring in an assortment of seeds (egg cartons work well for storage.)
3. Students can take a microscope look at the inside and outside of seeds.

Activity 5: A Plant Testing Affair

1. After familiarizing students with the parts of a plant, they will be ready to organize a plant snack. To begin, have students brainstorm food they eat that are plants.
2. Write the responses on the chalkboard.
3. Using colored chalk, circle the listed items to show different plant parts. For example, draw green circles around plant leaves (cabbage, lettuce, spinach), yellow circles around fruits and seeds (tomatoes, corn, oats, sunflowers, bananas, coconut), pink circles around stems (celery, asparagus, chives), and brown circles around roots (carrots, onions, potatoes, beets).
4. On the day of the snack, ask each student to bring a food sample of each plant part.
5. Arrange snacks on a long table and let the snacking begin. Encourage children to sample at least one food from each category.

Discussion Questions:

1. Do artificial plants move by themselves, need air, need food, or grow?
2. How do plants find food?
3. Do plants move about to find food?
4. What are some different plant parts?

Related Activities:

1. Take students for a short walk to identify some living and nonliving things.
2. Make a terrarium for plants.
3. Visit a greenhouse.
4. Coordinate math and reading activities around the plant.
5. Invite a local gardener to visit your classroom. Contact your local Extension Office for suggestions.
6. Make seed pictures in art class.

To be used with:
How Does Your Garden Grow?

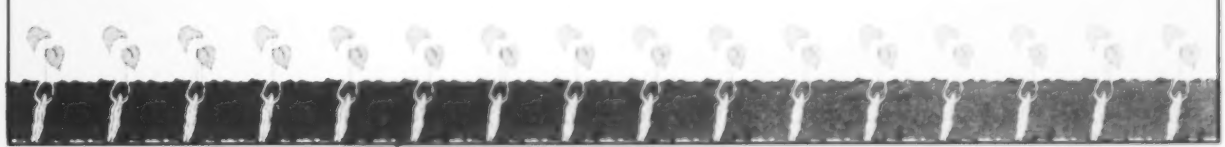
Name _____

My Plant Journal

I planted _____ seeds.

My seeds need _____, _____,
_____, and _____ to grow.

This is what happens as I watch my plant grow. (Draw what you see happen.)



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Farm Equipment

Grade Level: K-3

Approximate Length of Activity: 45 minutes

Objectives:

Teacher:

1. Provide information about types of farm equipment.
2. Emphasize how farm equipment makes farmers' jobs easier.
3. Encourage creativity in inventing a new type of farm equipment.

Students:

1. Learn how farm equipment helps farmers.
2. Learn how different types of equipment work.
3. Describe what farm life would be like without modern machinery.
4. Invent a new type of farm equipment.

Illinois Learning Standards: 11.B.1b; 13.B.1c; 13.B.1d; 17.C.1a; 17.C.1b

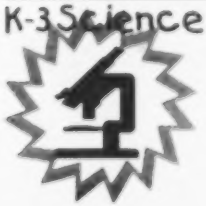
Introduction:

Farmers use many types of machinery and equipment to help them with their job. Some of the equipment and machinery that farmers use are tractors, combines, planters, mowers, tractor loaders, hay balers, and spreaders. These are not all of the pieces of equipment/machinery that some farmers need. The type of farming that a farmer does will determine what type of equipment and machinery he or she needs. The equipment and machinery used today help grain and livestock farmers produce better quality products in larger amounts. This means that one farmer can feed more people now than ever before.

Here are some of the pieces of equipment or machinery that farmers might need:

Plow/Disk Harrow – Plows, disk harrows, and cultivators can be used to prepare soil for planting. They dig, or till, the soil so the soil may receive adequate air and water.

Combine - Since the 1930's farmers have used machines called combines to pick the grain from the fields, also known as harvesting. A combine is a machine that separates grain from stems as it cuts a crop in the field. As combines cut the grain out of the field, it also removes the corn kernels from the cob and the soybeans from the pods. Then the combine stores the crop in a big tank that is part of the combine. When this tank gets full, the auger, which is a long arm on the side of the combine, moves the crop from the storage tank and dumps it into a truck or wagon.



Irrigation System – Irrigation systems give crops extra water when there is not enough rainfall to produce the best crops. One type of irrigation is surface irrigation which carries water through canals from bodies of water to holding ditches to the crops. Another type of irrigation is sprinkler irrigation, which pumps water from a well into a sprinkler that waters the crops.

Spreader – A spreader is a piece of equipment that spreads fertilizer onto the crops. Fertilizer contains nutrients that help crops grow.

Hay balers – A hay baler is a machine that rakes the straw or hay and packs it together into round or square shapes. Hay balers also put twine around the bale and drop it back onto the ground in the field.

Feeders – Automatic feeders have made feeding animals easier. The feed is mixed by a grain-O-vator and then sent to the animals on a conveyor belt. Some large feed mixers can weigh two tons when they are full. Automatic feeders are used for feeding chickens. The feeders have windows that automatically open to feed pans and allow the chickens to eat.

Sprayer – Sprayers spread liquid crop protection products to reduce insects and weeds. Sprayers usually have booms, which are arms that spray the crops. Some sprayers have booms that are 60 feet wide!

Milking Machine – Milking machines are used by dairy farmers. The machines milk the cows using a suction system and transport the milk to the bulk milk cooler through pipes. Milking by hand, a farmer would spend 2 and a half hours milking 20 cows. With milking machines, a farmer spends only 15 minutes milking 20 cows.

Grain Tank – These tall metal tanks hold animal feed and keep it fresh for a long period of time. Most grain tanks today can be activated to drop feed onto a conveyor which feeds the animals.

Bulk Milk Cooler – Bulk milk coolers keep milk cold until the dairy company comes to transport it to the dairy plant. Some milk coolers can hold up to 8000 gallons of milk.

Tractor – A tractor does many things on a farm. A tractor is used to plow, plant, cultivate, pull heavy loads, such as wagons filled with grain, and much more. Tractors can pull these heavy machines and equipment because they have powerful engines. In fact, tractor engines are so powerful that they equal the same power as 200 horses would have. Tractors also have huge tires to keep them from getting stuck in muddy places.

Silo – Silos are structures which store chopped plants and grains called silage. Silage is fed to cows, and silos keep the feed dry and fresh. Most silos are round and above ground. Some other types are the trench, bunker, and box silos. Silos are filled at the top by machines and the silage is packed tightly as it fills the silo. Silage can be unloaded from the bottom. A large silo can hold seven million pounds of silage. Silos can be made with stone, brick, clay tile, sheet metal, concrete, wood blocks, or fiberglass-lined steel.

Planter – A planter is a piece of equipment used to plant seeds in the fields. Planters will put the seeds in the soil and cover the seeds with more soil. Planters have tanks to hold the seeds that will be planted. There are feed meters on the planters to drop the right amount of seeds into the soil. There is a row of wheels on the planters to then cover the seeds with soil once they are dropped into the field. There are different types of planters that plant different crops. Farmers use corn planters to plant corn. To plant soybeans most farmers use a planter that is also known as a drill. A drill plants the rows of soybeans closer together than a planter would plant corn rows. Since corn stalks grow much bigger than soybean stalks, corn needs to be planted in wider rows. Soybeans can be planted in narrower rows, which also helps a farmer plant more rows of soybeans in one field.

Cultivator – Cultivators are used to loosen soil and dig out weeds.

Materials Needed:

- "Magnificent Machinery" pictures
- "Farm Equipment" worksheet

Activity Outline:

1. Read *Fun Facts About Farm Equipment* by Ray H. Miller or another farm machinery book to your class. (If you are unable to obtain a book, use the introduction information and the "Magnificent Machinery" pictures to introduce students to farm equipment.)
2. Give each student a "Magnificent Machinery" picture. These pictures will help students learn what each piece of equipment looks like.
3. Give each student the "Farm Equipment" worksheet. This worksheet is an activity that asks students to match the description of a piece of equipment with the name of a piece of equipment.

Discussion Questions:

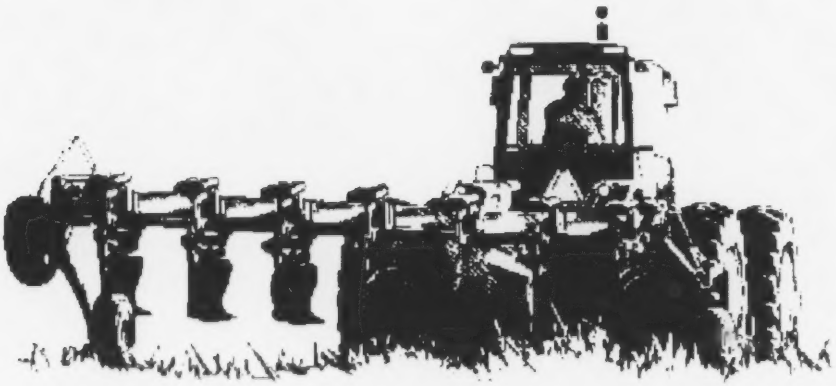
1. Describe what farm life would be like without modern machinery.
2. If you could invent a piece of farm equipment, what would it be?
3. Why are tractors important on farms?

Related Activities:

1. Think of simple machines (gears, pulleys, etc.) which might be part of different types of farm equipment.
2. Have groups of students invent a machine. Each student should act out a part of a machine while making a noise with the action. Have other group members join the first and become other parts of the machine while making their own noises. As the group works together, with each person performing an action and a sound, they become a machine.

To be used with:
Farm Equipment

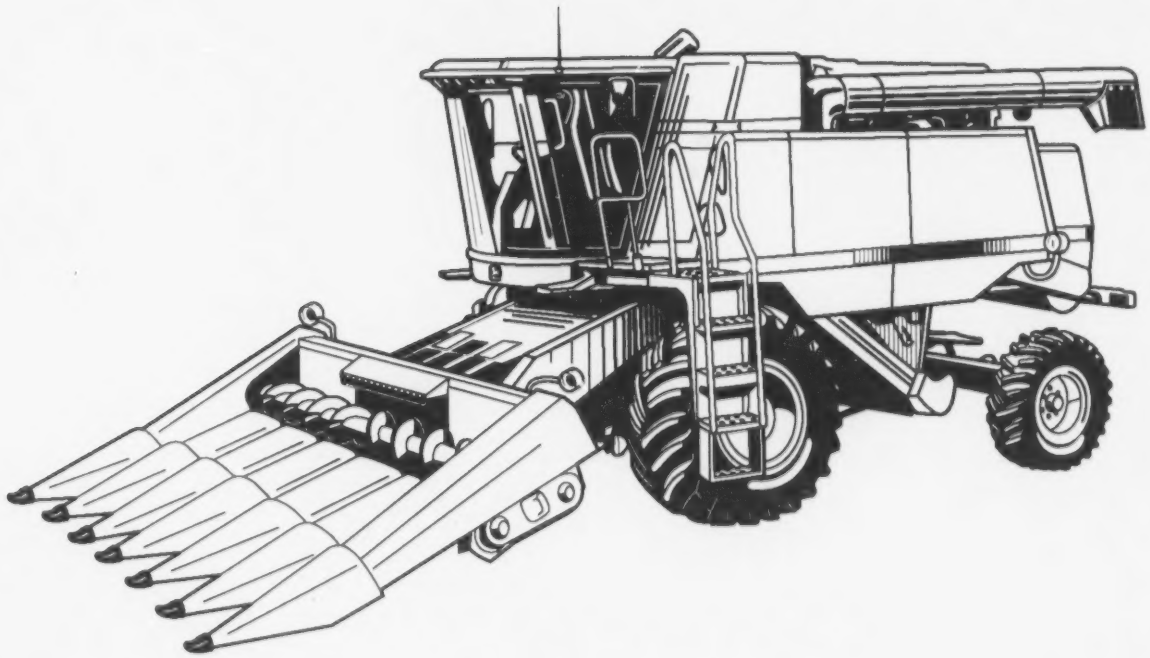
Magnificent Machinery



Plow

To be used with:
Farm Equipment

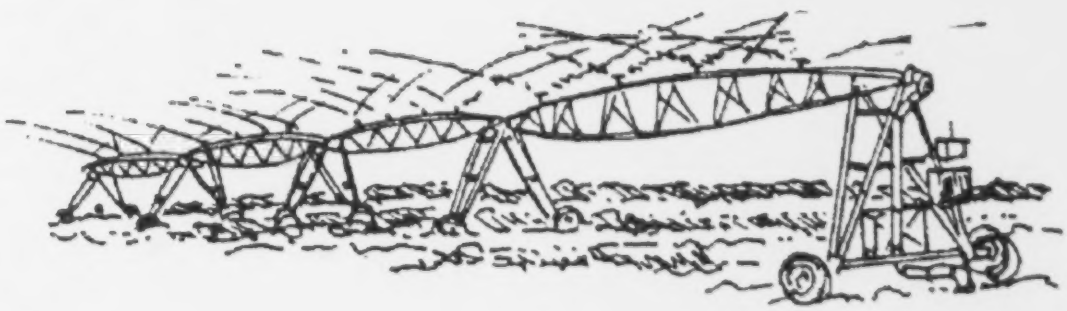
Magnificent Machinery



Combine

To be used with:
Farm Equipment

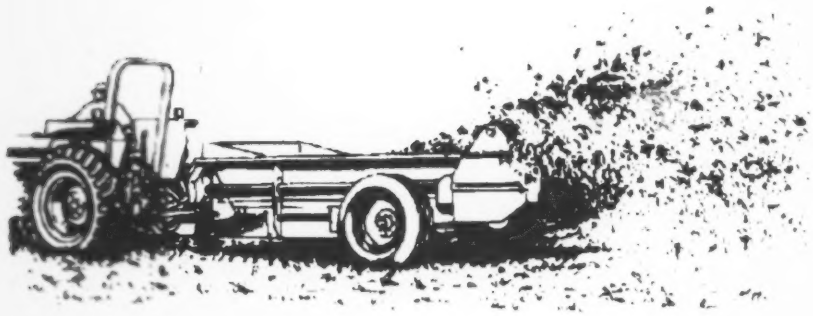
Magnificent Machinery



Irrigation System

To be used with:
Farm Equipment

Magnificent Machinery



Spreader

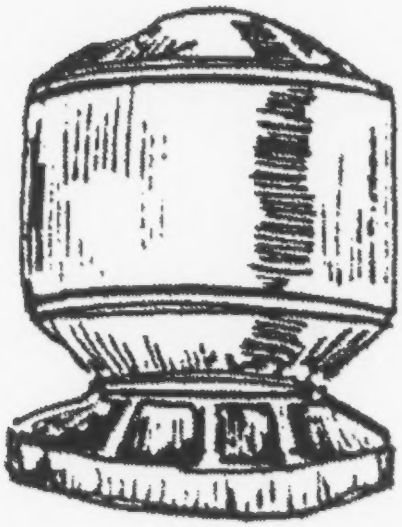
To be used with:
Farm Equipment

Magnificent Machinery

Hay Baler

To be used with:
Farm Equipment

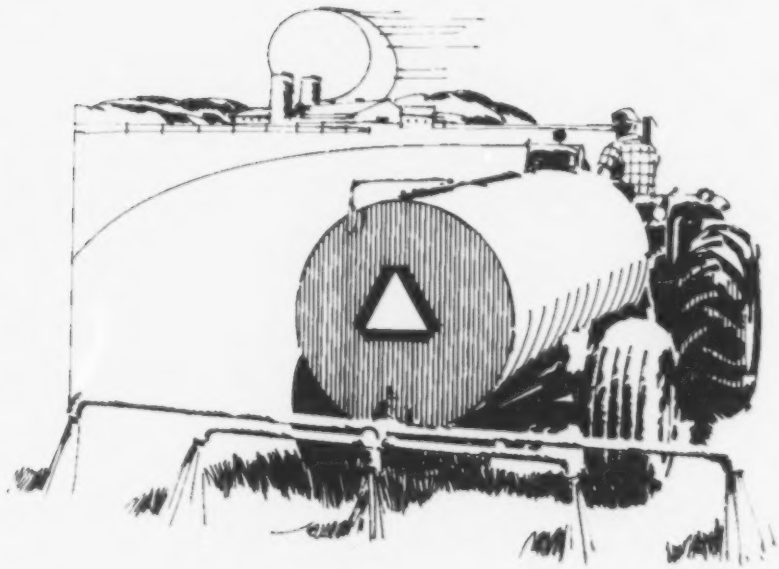
Magnificent Machinery



Feeders

To be used with:
Farm Equipment

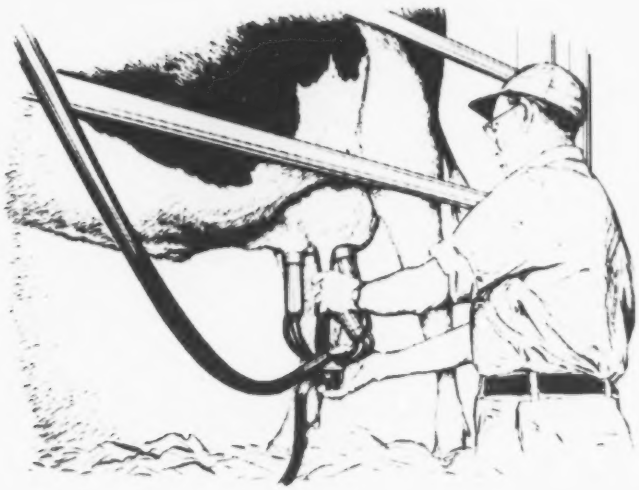
Magnificent Machinery



Sprayer

To be used with:
Farm Equipment

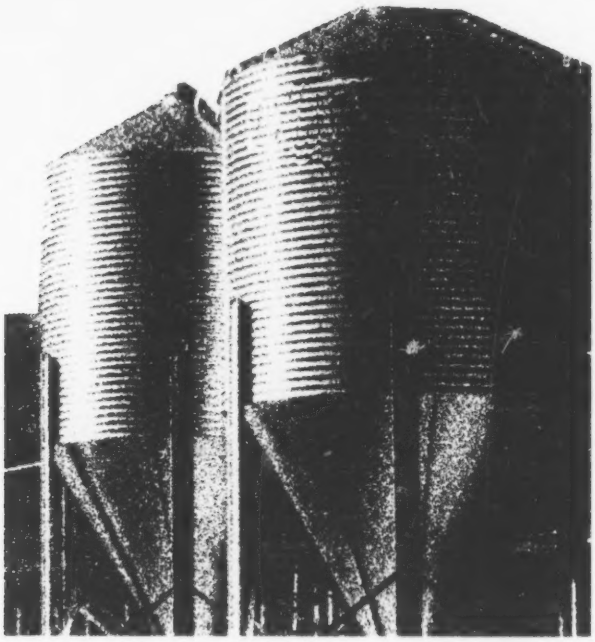
Magnificent Machinery



Milking Machine

To be used with:
Farm Equipment

Magnificent Machinery



Grain Tank

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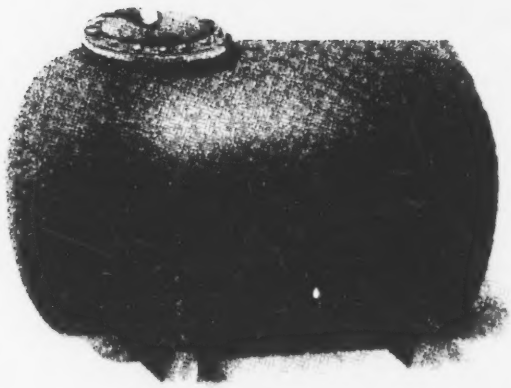
To be used with:
Farm Equipment

Magnificent Machinery

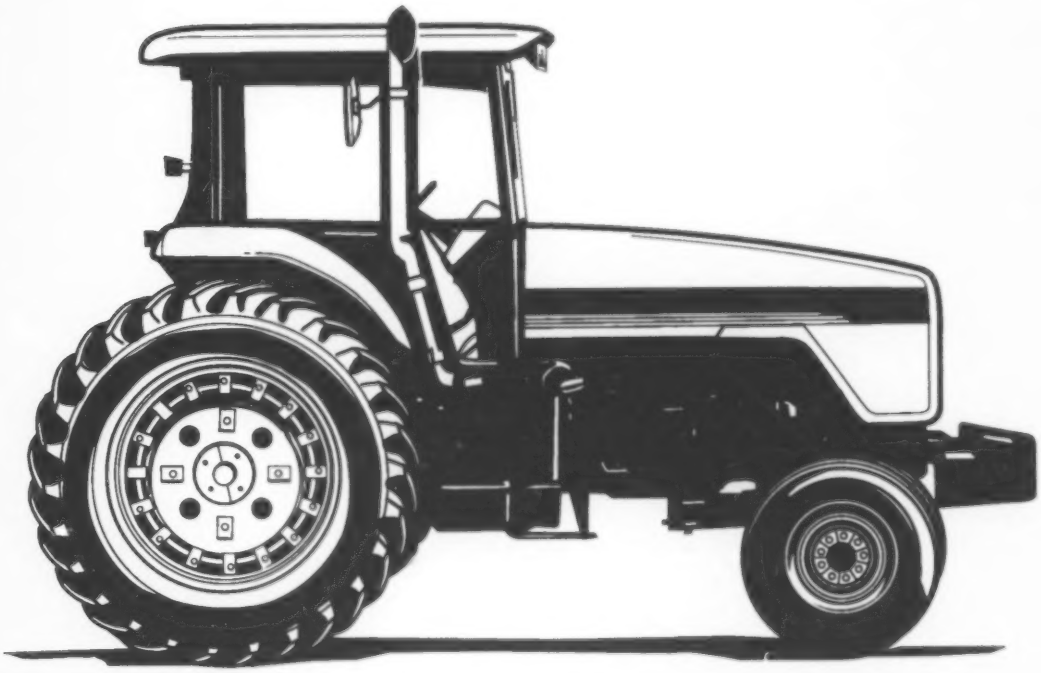


Bulk Milk Cooler

92

To be used with:
Farm Equipment

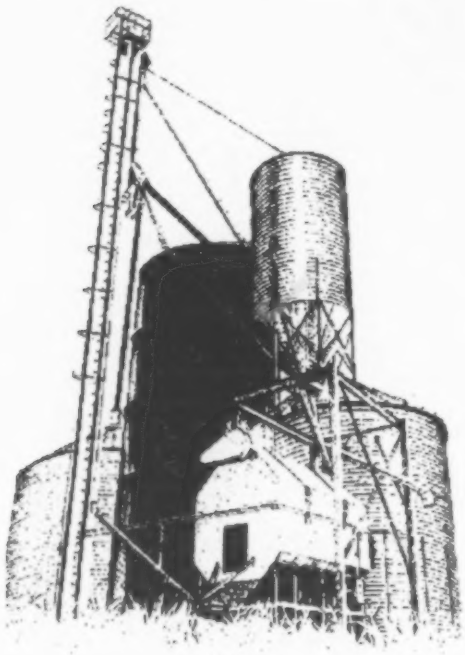
Magnificent Machinery



Tractor

To be used with:
Farm Equipment

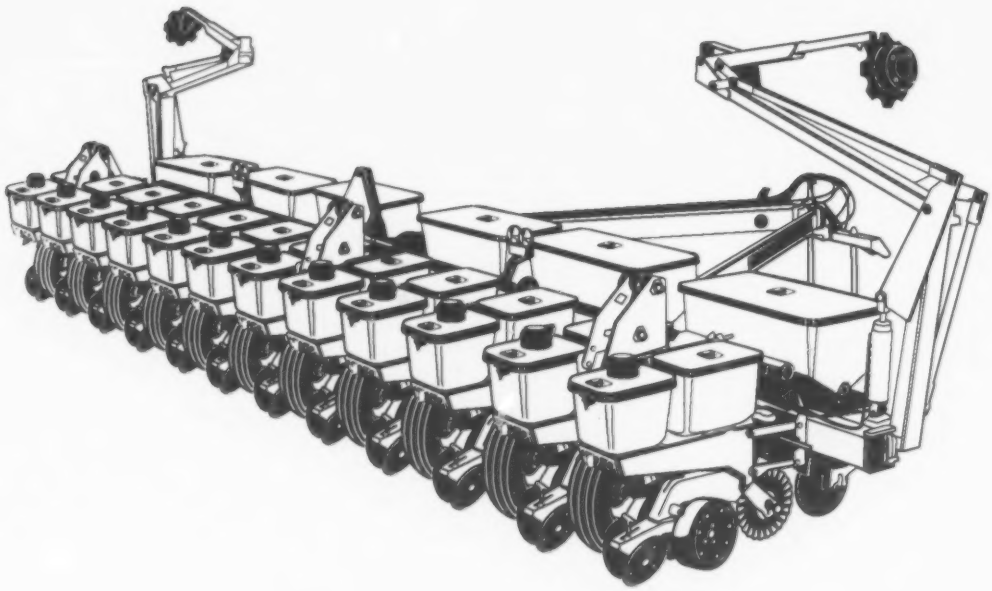
Magnificent Machinery



Silo

To be used with:
Farm Equipment

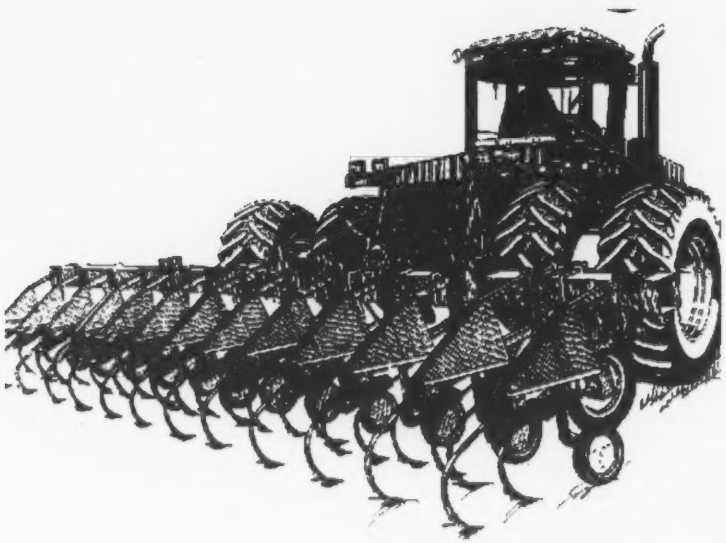
Magnificent Machinery



Planter

To be used with:
Farm Equipment

Magnificent Machinery



Cultivator

To be used with:
Farm Equipment

Name: _____

Farm Equipment

Directions: In each box, write the name of a piece of farm equipment that fits the description. Use the equipment at the bottom of the page.

Pulls a heavy load	Has a suction system to pump milk	Spreads fertilizer	Holds feed for animals
Gives crops extra water	Tills (or digs) soil	Loosens soil and digs out weeds	Holds silage for cows
Has a tank to hold seeds to plant	Sprays for weeds and insects	Harvests crops such as wheat and corn	Keeps milk cold
Has a rake to gather hay	Automatically feeds animals		

Farm Equipment Bank

Plow	**Combine**	**Cultivator**	**Irrigation System**
Spreader	**Hay Baler**	**Feeders**	**Sprayer**
Milking Machine	**Grain Tank**	**Bulk Milk Cooler**	**Tractor**
	Silo	**Planter**	

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To be used with:
Farm Equipment

Answer Key

Farm Equipment

Directions: In each box, write the name of a piece of farm equipment that fits the description. Use the equipment at the bottom of the page.

Tractor	**Milking Machine**	**Spreader**	**Grain Tank**
Pulls a heavy load	Has a suction system to pump milk	Spreads fertilizer	Holds feed for animals
Irrigation System	**Plow**	**Cultivator**	**Silo**
Gives crops extra water	Tills (or digs) soil	Loosens soil and digs out weeds	Holds silage for cows
Planter	**Sprayer**	**Combine**	**Bulk Milk Cooler**
Has a tank to hold seeds to plant	Sprays for weeds and insects	Harvests crops such as wheat and corn	Keeps milk cold
Hay Baler	**Feeders**		
Has a rake to gather hay	Automatically feeds animals		

Farm Equipment Bank

Plow	**Combine**	**Cultivator**	**Irrigation System**
Spreader	**Hay Baler**	**Feeders**	**Sprayer**
Milking Machine	**Grain Tank**	**Bulk Milk Cooler**	**Tractor**
	Silo	**Planter**	

Terrific Tubers

Grade Level: K-3

Approximate Length of Activity: 45 minutes

Objectives:

Teacher:

1. Give students a benchmark for potato production economics in relation to their personal knowledge.
2. Help students learn about the science of potato growth.

Students:

1. Demonstrate an understanding of the potato market by comparing $6, the average price per 100 pounds (cwt), to the price we pay for potatoes at the supermarket.
2. Learn the history of potato production and its importance to the world.
3. Learn how a potato plant grows and what a new potato plant begins from.

Illinois Learning Standards: 4.A.1a; 4.A.1b; 4.B.1b; 6.A.1a; 7.A.1c; 12.A.1a; 15.C.1a; 16.C.1a(W); 17.C.1a; 18.C.1

Introduction:

Potatoes were first grown in the Andes mountains of Bolivia and Peru, making them one of the few vegetables which originated in the Western hemisphere. Pictures of potatoes have been found on ancient pottery and Native Americans trampled and dried potatoes to preserve them. In 1570, potatoes were taken from South America to Europe. Around 1720, rulers of several European countries ordered people to grow potatoes. After potatoes were popular in Europe, Americans started eating them more. Potatoes became the main food for Ireland, but two years of poor crops in the 1840s caused many people to move to the United States.

Potatoes are a very important crop throughout the entire world. The United States, China, Russia, Poland, and Ukraine are some of the countries that produce potatoes. Here in the U.S., almost every state produces potatoes, but Idaho and Washington are the leading potato-producing states.

In Illinois there are 102 farms that grow Irish potatoes and seven farms that grow sweet potatoes. In 1997, Illinois harvested 4.6 thousand acres of potatoes. The total production of potatoes was 149,500,000 pounds, with an average of 32,500 pounds per acre. The average price per 100 pounds (cwt.) for potatoes is $6.*

A potato is a plant called a tuber. A tuber grows underground on stems. The potato plants grow leafy stems and flowers above ground, and stems and tubers below ground. These tubers then become the potatoes. Potatoes take 60-90 days to develop into an edible stage. Some plants can grow 10 to 20 tubers (potatoes) underground but most potato plants average three to six tubers.

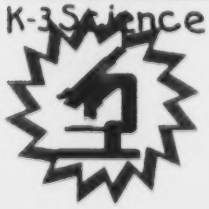
Potatoes are replanted each year because the plants die after the tubers mature into potatoes. Potato growers that grow lots of potatoes use machines to plant the potatoes. Small, whole tubers and segments of tubers are planted and new potato plants grow from these pieces. The tuber segments have at least one eye (bud) and the whole segments usually have more than one eye. These "eyes" are where new stems grow above and below ground. Then the stems below the ground will grow new tubers. When these tubers are mature, the potato growers use potato combines to dig the potatoes out of the ground. These combines also separate the potatoes from the soil and put the potatoes into trucks.

Materials Needed:

- Two potatoes
- A paring knife
- A potato book (optional: see Activity Outline)

Activity Outline:

1. Discuss the history of potatoes, potato growth, and potato production. You may want to read *Potatoes*, by Claire Llewellyn, *Potato*, by Barrie Watts, or *Potato; A Tale from the Great Depression*, by Kate Lied.
2. Discuss the information from the first paragraph above. Here are some ideas to help the students understand the economics of potato production:
   a. Tell the students that an acre is about the same size as a football field.
   b. Talk about how much a pound is and how much 32,500 pounds are.
   c. Talk about dollars and cents. Tell the students that $6 is the average price per 100 pounds (cwt) of potatoes that the farmer receives. Find the retail price per pound at a supermarket. What is the difference between the price producers receive (remember, it's per 100 pounds) and the retail price?
   d. Tell the students that each acre of potatoes harvested brings the producer about $1787. Tell them that this is about the price of a computer so they have something to compare it to.
3. Teach the students about potatoes and the "eyes" (or buds) on the potatoes. Show the students where the buds are on the potatoes.
4. Discuss with the students that from one potato, many other potatoes can be grown. Cut one of the eyes off of a potato. Show this to the students and discuss how this piece of potato, if planted, will grow into a new potato plant. This new potato plant will then grow about three to six new potatoes.



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5. Once they have understood this concept, explain to them that this is how potato growers grow more potatoes. They plant parts of the potatoes from last year to make new potatoes for this year. This is how potato farmers, or growers, make money. They need to plant a healthy crop and produce lots of good-sized potatoes. Then they sell their potato crop and get money for their potato production.

Discussion Questions:

1. How many potatoes are produced in Illinois?
2. What part of the potato plant do potatoes grow from?
3. Why are potatoes important to the food system of our world?
4. How many new potatoes could possibly grow from one potato eye?
5. What part of the potato plant grows above ground? What grows below ground?

Related Activities:

1. Brush iodine on the inside of a potato. If it turns purple, it still has starch left. (Potatoes lose starch as they mature.)
2. Make potato stamps by cutting a potato in half and then carving a design on the inside. Dip the stamp in paint and apply to paper or other surfaces.
3. Make a list of all the potato products you might find in a grocery store.
4. Create a recipe box of favorite potato dishes around the world. Find the top potato production countries on a map.
5. Cut a half-inch cube around the eye of an old potato. Line a pot with pebbles and plant the cube in soil on top of the pebbles. Cover the cube with more soil, place the pot in a warm place, and water your tuber every other day. The tuber will grow into more tubers.
6. Set an old potato on a countertop. Record how long it takes for sprouts to develop and measure the sprouts.
7. Look at the school menu. How often are potatoes served?

Other Resources:

Potato Statistics: www.nass.usda.gov/il/1998/9871.htm

* Potato prices are average prices for Spring 1999.

How A Seed Grows – And Who Grows It?

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Provide a hands-on activity for students to examine how a seed grows.
2. Guide students in recognizing how many careers are needed to grow and market a product such as popcorn.

Students:

1. Observe the growth of a popcorn plant from seed to plant and to understand where popcorn comes from and how it is grown.
2. Learn a plant's life cycle and how many people (careers) are involved in the growing and marketing of popcorn.

Illinois Learning Standards: 11.A.1a; 15.C.1a; 15.D.1a

Introduction:

Plants, such as corn plants, are beneficial to us because they give us oxygen, food, fiber, and many other products. Each corn seed has an embryo, or a baby plant with the potential to grow. Seeds need warmth, moisture, and oxygen to grow. Seeds will not germinate, or grow, until they have the proper environment. This is called dormancy. Some seeds have been dormant for 20-40 years and still germinate. Most seeds grow best between 65°F and 85°F. Seeds receive their moisture from the ground. This moisture softens the seed coat and the growing parts are able to break through. A seed will rot if it receives too much water. A seed will germinate slowly or not germinate if it receives too little water. Oxygen is used as the plant grows. As a seed sprouts, a root will push into the ground for water and a stem will push up for light.

Corn plants will grow under poor conditions, such as cool temperatures, lack of moisture, and lack of oxygen, but the plants may not be as healthy or as productive as those grown under optimum conditions. The growing environment for plants can be improved by irrigating, fertilizing the soil, planting crops during warm seasons, and planting crops that are compatible to the soil and environment.

There are five different kinds of corn but only one kind that pops — popcorn! Popcorn kernels are smaller than other types of corn. Popcorn is only used for popping, whereas field corn is used for livestock feed, grocery products, and many industrial products. Popcorn grows on the cob, just like field corn and sweet corn. Popcorn kernels are dry on the outside, but they have water stored inside. Whenever popcorn is heated, water inside begins to boil. As this water turns to steam, the water expands, or takes up more space. This causes the popcorn kernel to swell until the steam shoots out, and the popcorn pops, turning inside-out. Air rushes in and fills the space left by the escaped steam. Popcorn with about 13.5 percent moisture pops best. The kernels expand 30 to 40 times their original size when popped.

The popcorn you buy in the store is usually white or yellow, but popcorn kernels can be almost any color. Some popcorn kernels are red, purple, or black. But no matter what color it is on the outside, all popcorn is white when popped.

The farmer is an important person in getting popcorn to you as a customer, but the farmer is only one of many. Various kinds of scientists are always trying to develop a better plant — one that produces more, has a better root system, grows faster, stores better, tastes better, pops bigger, etc.

Other people help the farmer know if his/her soil needs something added to make crops grow better. There are people who deliver the minerals and fertilizers which may be needed. After the corn is grown, it must be harvested. Then there are people who transport the corn to a place where it can be packaged (a package designed by people who do only that!), advertised by a company, and shipped to a store where other people sell it to you, the customer.

Popcorn probably originated in Central America. Native Americans grew popcorn at least 1000 years before the European explorers arrived in the 1400s and 1500s. They used popcorn for food, decoration, and in religious ceremonies. Nowadays, Illinois, along with Indiana and Nebraska, leads the country in popcorn production.

Materials Needed:

- *Mr. Picklepaw's Popcorn*, by Ruth Adams and/or *The Popcorn Book* by Tomie de Paola
- *Miracle of Corn* video (Call your county Farm Bureau® or Illinois Farm Bureau® to find out how to obtain a copy.)
- Clear plastic drinking cups
- Paper towels
- Popcorn
- Masking tape
- Water

Activity Outline:

1. Read *Mr. Picklepaw's Popcorn* by Ruth Adams and *The Popcorn Book* by Tomie de Paola.
2. Talk about the difference between field corn and popcorn. Discuss how corn is grown. Discuss the many jobs that are necessary to get popcorn from the field to the consumer.
3. Tell the students that popcorn pops because the water inside boils with heat. Fill a jar with popcorn and add hot water to the jar until it is full. Predict what will happen. (The popcorn will swell and push off the lid.)
4. Fold a paper towel to make it fit on the inside of the plastic drinking cup. Get it wet, but squeeze out excess water. Then put the towel inside the cup. Put 2 or 3 kernels of popcorn between the paper towel and the cup so that the seeds are visible. Students should put their names on pieces of masking tape to put on the cups. Set the cups in the sun. As the seeds germinate and the plants grow over the rim of the glass, the children may take them home to plant.
5. Make popcorn in your classroom.
6. Show the *Miracle of Corn* video to educate students on the growth of a corn plant. Eat popcorn as you watch the video!

Discussion Questions:

1. What conditions does popcorn need to grow?
2. Did everyone's plant grow the same amount? If not, what might have made the difference? (Towel was wetter, dryer, more or less sun, etc.)
3. What does a farmer need to do to grow popcorn?
4. Name two people besides the farmer that help to bring popcorn to you.
5. Out of the careers discussed, ask the students which ones they would like to do.

Related Activities:

1. Try different varieties of popcorn and see which pops the best.
2. Learn more about the parts of a plant.
3. Make popcorn pumpkins.
   a. Place three tablespoons of marshmallow creme in a bowl.
   b. Add orange food coloring and mix.
   c. Add one cup of popcorn to the marshmallow creme.
   d. Shape the popcorn into a ball.
   e. Add a face to your pumpkin using candy.

Other Resources:

The Popcorn Book, Scott Foresman Reading Series, Level 3, Copyright 1971.

Now You Have It, Now You Don't

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Make students aware of scientific discoveries.
2. Help make our environment pollution-free by the use of biodegradable products.

Students:

Learn how new products can help our environment.

Illinois Learning Standards: 12.E.1c; 13.B.1d; 13.B.1e

Introduction:

Corn is a tall member of the grass family of plants. Other plants in the grass family are wheat, oats, sorghum, foxtail, and bluegrass. Unlike many types of grasses, corn is an annual plant, meaning that it cannot survive the winter and must be planted again each year. Because we can plant the corn seeds whenever we need corn, we call it a renewable resource.

Corn has a strong, solid stem and long, narrow leaves. Corn leaves encircle the stem and are attached alternately on opposite sides of the stem. Corn plants usually have an extensive root system. Their flowers are small and grow in dense spikes or open, branching clusters called panicles.

Corn is one of nature's most amazing energy-storing devices. A corn seed weighs about one-hundredth of an ounce. Yet this tiny seed can produce a corn plant that will grow seven to 10 feet tall and produce between 600 and 1000 seeds like the one from which the plant started. The "seeds" are commonly known as corn kernels on an ear of corn. The kernels are arranged in rows along the ear. An ear of corn may have as few as eight or as many as 36 rows, but the number of rows is always even. The kernels that you find on an ear of corn will become corn seeds to plant for the next year.

The corn seed (kernel) is composed of three main parts: the seed coat or pericarp, the endosperm, and the embryo. Each of these three parts has a role to play in producing a new corn plant. The pericarp is a hard, outer coat that protects the seed both before and after planting. It prevents bacteria and fungi from entering and destroying the seed. The endosperm makes up about four-fifths of the kernel's weight. Its chief function is to provide food energy for the young plant until the plant's roots have grown enough to make food energy on its own. The embryo of the corn seed has two main parts: the tiny plant itself and the cotyledon.

Illinois and Iowa are the major corn producing states in the United States. American farmers use more land for corn than any other crop, and corn provides more food for people than any other crop grown. Altogether, about 4000 of the products in a typical supermarket contain some product or byproduct of corn.

In autumn, corn is harvested with combines. Combines are machines which pick, shuck, and shell the ears of corn right in the field. The corn is unloaded from the combine into a truck or wagon with an unloading auger. When the trucks and wagons are filled with corn, the corn is taken to a grain elevator or unloaded into a storage bin on the farmer's farm. A grain elevator is a cylinder made out of poured concrete. When a truck or wagon with grain arrives at the elevator, it is weighed. The clerk at the elevator office subtracts the weight of the wagon or truck from the total weight to determine the weight of the corn. The clerk at the elevator also measures the moisture content and weight of the corn using a sample. Next, the trucks and wagons go to the elevator storage area. Here the corn is dumped into a pit and then drawn into the elevators with augers in a pipe system. Most corn is used for livestock feed. The corn that is not fed to livestock may be processed in mills, used for by-products, or exported.

Packing peanuts made with corn are similar to packing materials made with styrofoam. However, packing peanuts made from corn are biodegradable and therefore more environmentally friendly. These packing materials are used to protect fragile items during shipping. Another environmentally friendly use of corn can be found in fuel. Ethanol, a corn based product, is being used more and more to replace petroleum based fuel. Petroleum based fuels pollute the air when burned, but ethanol burns clear and does not give off poisonous gases. Plus the oil used for petroleum-based fuels is a non-renewable resource. Ethanol will never be limited in supply because corn is a renewable resource, which means it can be grown whenever needed. This lesson will show how the corn-based packing peanuts are much more valuable to our environment than the styrofoam packing material.

Materials Needed:

- "Agriculture Products of Illinois" handout
- "Look What Grows on Illinois Farms!" worksheet
- Corn-based shipping peanuts (Contact Illinois Corn Growers Association at 309-557-3257 or contact your county Farm Bureau® office)
- Bowl or sink with water
- Styrofoam™ peanuts

Activity Outline:

1. Review what products are made in Illinois using the "Agriculture Products of Illinois" handout.
2. Ask students to complete "Look What Grows on Illinois Farms!" worksheet.
3. On an individual basis or in very small groups, give students a few pieces of the corn-based peanuts to wash thoroughly. As students try, the peanuts dissolve.
4. Give the students some more and ask them to wash more carefully. Discuss how a product can be made both useful and environmentally safe.

5. After several or all the students have tried to wash the corn-based peanuts, teach what the shipping peanuts are used for.
6. Show the Styrofoam™ shipping peanuts and compare what happens to them in water.

Discussion Questions:

1. Why is it so important for scientists to keep working on ways for items to be disposed of easily?
2. What other products are made with Styrofoam™?
3. Is it possible to use the new corn-based product in place of all the Styrofoam™ products?

Related Activities:

1. Extended Classroom — Trip to a landfill.
2. Write to companies asking them to ship their products in corn-based peanuts.
3. Introduce a unit on corn and corn byproducts.

Other Resources:

1. The Illinois Farm Bureau® Ag In The Classroom program has developed an educational newspaper called *Ag Mag* 11 that offers additional information about corn. Please contact your county Farm Bureau® for information about receiving copies for your classroom.
2. Books:
   Environmental Atlas for Children, Unicef.
   Children's Atlas of the Environment, Rand McNally.
   Rescue Mission Planet Earth, United Nations Agenda 21.
   This Planet Is Mine, Scholastic.
   Environmental Education, Frank Schaffer Publications.
   EarthSearch, John Cassidy, Klutz Press.
   Science in Your Shopping Cart, United States Department of Agriculture, call (202) 720-2791.
3. Videos:
   The Rotten Truth #121-VC, Ages 5-12, 30 minutes and *Zorts Sorts*, #93-VC, Ages 5-12, 15 minutes. Available from Illinois Power, call (217) 424-6600.
4. Web Sites:
   Illinois Corn Growers Association: www.ilcorn.org
   National Corn Growers Association: www.ncga.com

To be used with:
"Now You Have It, Now You Don't"

Name: _____

Agriculture Products of Illinois

Corn

Baby foods
Processed cheese products
Vegetable oil
Margarine
Fruit juice drinks
Cleaners
Detergents
Sandpaper
Charcoal briquettes
Photographic films
Chewing gum
Glues & adhesives
Cereals
Sweeteners
Chocolate Products
De-icers for roads
Ethanol-blended fuels
Antibiotics
Potato chips
Shortening
Thickening agent
Soft drinks
Plastics
Cosmetics
Wall coverings
Rubber tires
Paints & varnishes
Degradable diapers
Degradable plastic trash bags
Rayon
Dry cell batteries
Crayon and chalk (as a binder)
Surgical dressings
Catsup, chili sauce
Plywood (interior)
Printing ink
Ceiling tiles
Shoe polish
Aspirin

Cattle

Beef
Dairy products
Marshmallows
Piano keys
Floor wax
Cake mixes
Photographic film
Insulin
Vitamins
Chewing gum
Cosmetics
Boots & Shoes
Perfumes
Ceramics
Soaps
Plastics
Textiles
Pet foods
Candles
Pharmaceuticals
Glue
Bandages
Shaving cream
Sutures
Luggage
Shoe polish
Insecticides
Oleo margarine
Pasta
Mayonnaise
Flavorings
Deodorants
Detergent
Linoleum
Paints
Leather sporting goods
Wallpaper
Sheet rock
Combs
Artist's paint brushes

Soybeans

Cooking oils
Mayonnaise
Pharmaceuticals
Caulking compounds
Disinfectants
Electrical insulation
Insecticides
Herbicides
Printing inks
Soap
Wallboard
Glue
Animal feeds
Paint
Candy
Plywood
Chocolates
Pet foods
Detergent
Cosmetics
Bakery goods
Salad dressings
Vegetable shortening
Margarine
Coffee creamer
Cereals
Infant formula
Baby food
Soy sauce
Environ™ building material
Diesel fuel
Pesticides
Vinyl plastics
Rubber
Fabrics
Tofu
Frozen pizza
Adhesives
Hypo-allergenic milk
Antibiotics

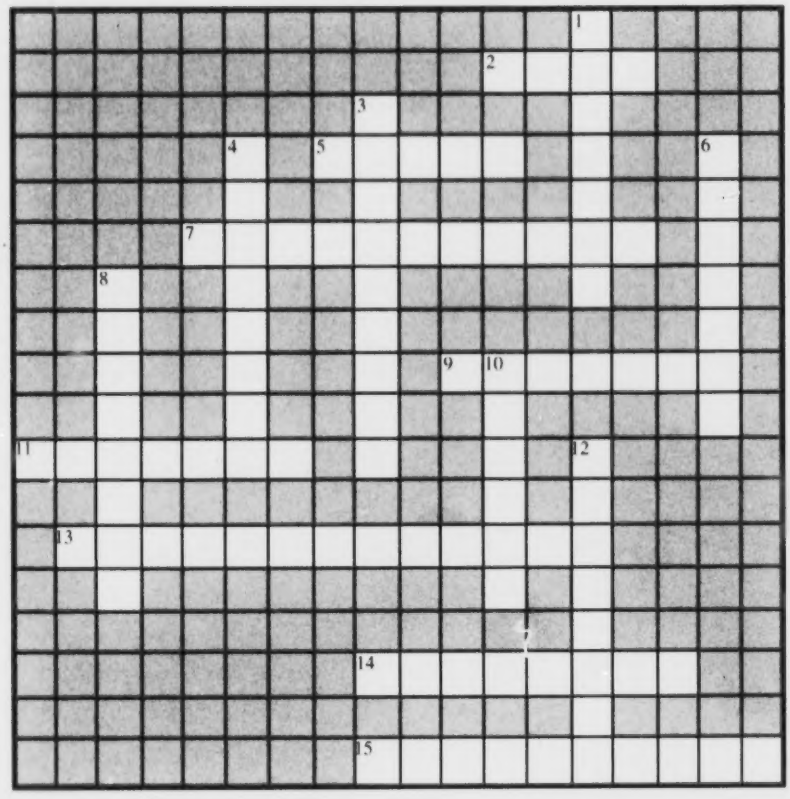
Hogs

Pork chops
Roasts
Ham
Antifreeze
Plywood adhesive
Fabric dye
Glue
Glass
Water filters
Lubricants
Crayons
Heart valves
Cosmetics
Plastics
Pet foods
Upholstery
Paint brushes
Gelatin
Fabric softeners
Wood putty
Furniture polish
Insecticide
Rubber gloves
Chalk
Bacon
Spareribs
Cement
Floor wax
Insulation
Gloves & leather
Sausage casings
Chewing gum
Combs
Buttons
Fertilizer
Thyroid extract
Insulin
Burn dressings
Cortisone
Plasmin

To be used with:
Now You have It, Now You Don't

Name _____

Look What Grows On Illinois Farms!



ACROSS

2. These come in a pod, are deep green, loaded with vitamins and roll around your plate until you eat them.
5. These strange looking animals are distant cousins to the camel, but are more at home in the mountains of South America. Their hair is valuable for weaving into cloth.
7. Long white root that might make you think of the Kentucky Derby. Illinois produces more than any other state.
9. People enjoy this snack food at the movies and at home.
11. You will find this vegetable mostly in pies, but sometimes they have a scary face in the fall.
13. These plants are grown so you can buy them and plant them in your garden.
14. People like these mashed, french fried, baked, and boiled.
15. This relative to pumpkins and gourds is deep red, juicy, and sweet on the inside with a hard rind on the outside.

DOWN

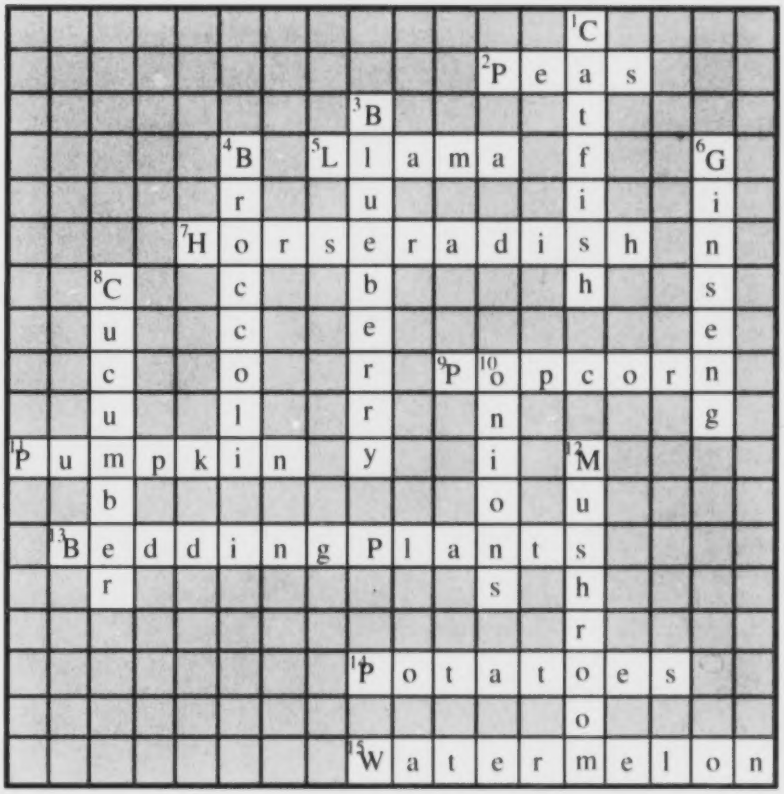
1. This animal may look like it has whiskers, but would rather swim in a pond or river.
3. This delicious fruit is grown in a bog, but you might enjoy them in a muffin.
4. This dark-green vegetable is a surprisingly good source of vitamin C and even protein. It's a member of the cabbage family, but looks much different.
6. This root is prized in the Orient and is sometimes shaped like a human body.
8. A pickle gets its start in the farmer's field and is called by this name.
10. You might cry a little when you cut up this vegetable.
12. Grown in the dark, this food product might end up on your pizza.

Bedding Plants
Blueberry
Broccoli
Catfish
Cucumber
Ginseng
Horseradish
Llama
Mushroom
Onions
Peas
Popcorn
Potatoes
Pumpkin
Watermelon

To be used with:
Now You have It, Now You Don't

Answer Key

Look What Grows On Illinois Farms!



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Watermelon

Corn Harvest

Grade Level: K-3

Approximate Length of Activity: Three to four class periods

Objectives:

Teacher:

1. Improve students' listening skills and comprehension.
2. Provide students with information on the harvesting of corn and storing corn at a grain elevator.

Students:

1. Practice listening skills as the teacher reads a book to the students.
2. Discuss in detail the information read to them.
3. Correctly write sentences and a paragraph about corn and what happens at a grain elevator.

Illinois Learning Standards: 3.A.1; 4.A.1a; 4.B.1b; 5.C.1a

Introduction:

Corn is a tall member of the grass family of plants. Other plants in the grass family are wheat, oats, sorghum, foxtail, and bluegrass. Unlike many types of grasses, corn is an annual plant, meaning that it cannot survive the winter and must be planted again each year. Because we can plant the corn seeds whenever we need corn, we call it a renewable resource.

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planting. It prevents bacteria and fungi from entering and destroying the seed. The endosperm makes up about four-fifths of the kernel's weight. Its chief function is to provide food energy for the young plant until the plant's roots have grown enough to make food energy on its own. The embryo of the corn seed has two main parts: the tiny plant itself and the cotyledon.

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In autumn, corn is harvested with combines. Combines are machines which pick, shuck, and shell the ears of corn right in the field. The corn is unloaded from the combine into a truck or wagon with an unloading auger. When the trucks and wagons are filled with corn, the corn is taken to a grain elevator or unloaded into a storage bin on the farmer's farm. A grain elevator is a cylinder made out of poured concrete. When a truck or wagon with grain arrives at the elevator, it is weighed. The clerk at the elevator measures the moisture content of the corn by using a sample and weighs the truck and wagons with corn in them. Next, the trucks and wagons go to the elevator storage area. Here the corn is dumped into a pit and then drawn into the elevators with augers in a pipe system. When the trucks and wagons are empty, the farmer drives them back over the scale to determine the weight of the truck and wagons. The clerk at the elevator then takes the weight from before (when the corn was in the truck/wagons) and subtracts the weight of the empty truck/wagons. This gives the elevator the weight of the corn that the farmer brought in.

Materials Needed:

- "Corn Belt Harvest" worksheet
- *Corn Belt Harvest* by Raymond Bial
- Paper
- Pencil
- Markers
- Crayons
- Rulers

Activity Outline:

Part 1:

1. Read *Cornbelt Harvest* by Raymond Bial, Houghton Mifflin, Boston, 1991.
2. Discuss the book and the uses of corn.
3. Have students write several sentences about how corn is used. Then have the students underline the nouns in their sentences and circle the verbs.
4. Ask students to complete the "Corn Belt Harvest" worksheet. For younger students, ask them questions on the worksheet and discuss the answers.

Part 2:

1. If possible, take a field trip to a cornfield where corn is being planted, grown, or harvested. Contact your county Farm Bureau® to arrange a trip. Ask the farmer to show

the students the different parts of the corn and explain how the machinery used during harvest works. If this is not possible, have a farmer come to the classroom to talk to the students.

2. If possible, travel to a grain elevator. Here the students will see the process that goes on at an elevator. At the elevator, ask the manager to explain where the corn goes after the farmer brings it to the elevator. (If you are unable to take a field trip to a farm or the grain elevator, contact your county Farm Bureau® to arrange for a farmer or elevator manager to come to your classroom to discuss corn harvesting.)
3. When finished with the field trip or classroom presentation, have the students write a paragraph in a journal about what they have learned.
4. Day Two optional activity: Cornbread in a Bag
   Materials:
   - 1 cup cornmeal
   - 1/2 cup whole-wheat flour
   - 1/2 cup all-purpose flour
   - 4 teaspoons baking powder
   - 1/2 teaspoon salt
   - 2 tablespoons brown sugar
   - 2 eggs, beaten
   - 1 cup milk
   - 1/4 cup oil
     a. Combine first six ingredients in a large plastic bag.
     b. Close the bags and mix well by working bag with fingers until the ingredients are completely blended.
     c. Add the final three ingredients. Mix well by working the bag with fingers.
     d. Open the bag and pour the mixture into a 9 X 9" pan.
     e. Bake at 400°F for 25 minutes.

Part 3:

1. Discuss how corn is harvested and stored at the elevator. Review what the students saw or heard on their field trip.
2. Divide the students into cooperative groups.
3. Have each group design a poster that shows the harvesting of corn and the process at the grain elevator.

Discussion Questions:

1. What machine is used to harvest corn? (combine)
2. Where does the corn go after it leaves the grain elevator? (possible answer—it is transported on a barge down the river)
3. How does corn leave the elevator? (by trucks or by railcars)
4. What did you learn on the field trip? (answers will vary)

Related Activities:

1. Use cornhusks and shelled corn for art projects.
2. Counting activities using shelled corn.
3. Use corn stalks for science lessons.

To be used with:
Corn Harvest

Name: _____

Corn Belt Harvest

After reading *Corn Belt Harvest*, answer the following questions:

1. What is the Corn Belt?

2. What happens to the corn fields in the fall? In the spring?

3. How is corn production different than it was in the early 1900s?

4. What does a cultivator do?

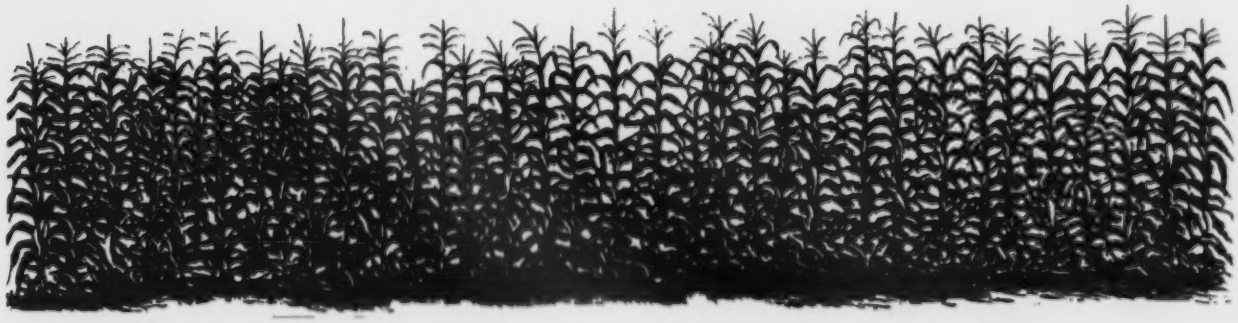
5. Why is the phrase 'knee-high by the Fourth of July" outdated?

6. What do the brace roots of corn plant do?

7. 90 percent of all corn grown in the U.S. is dent corn (field corn). This is different than the popcorn or sweet corn we eat. What is most dent corn used for?

8. What does a combine do?

9. What happens to corn that is not fed to livestock?



To be used with:
Corn Harvest

Answer Key

Corn Belt Harvest

1. The Corn Belt is the region covering western Ohio, Indiana, Illinois, Iowa, Minnesota, Missouri, Nebraska, and South Dakota. Three-fourths of the corn grown in the U.S. is from the Corn Belt.

2. Corn fields are harvested in the fall and planted in the spring.

3. In the early 1900's, a large family could barely keep up with the work of a 80-120 acre farm because most of the labor was done with horses or by hand. Today, farmers have tractors and implements and they are able to manage hundreds of acres.

4. A cultivator is an implement that is pulled behind a tractor to scrape (remove) weeds.

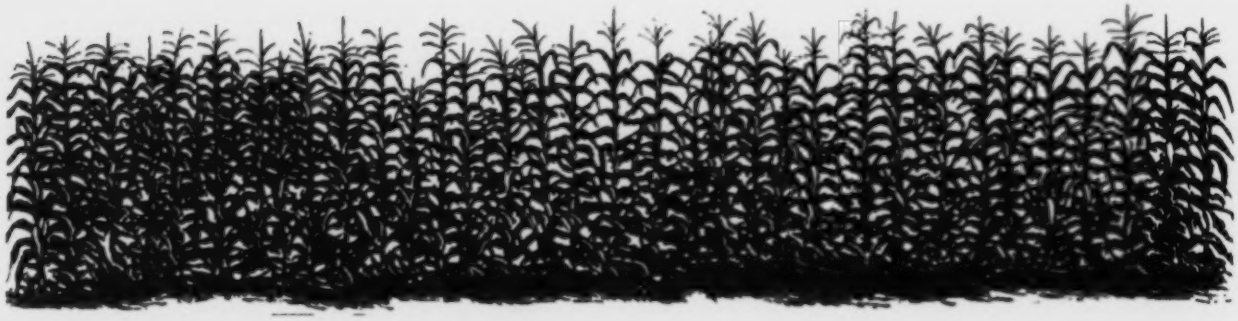
5. Farmers used to say that corn should be "knee-high by the Fourth of July," but now corn is as tall as a person's head by the Fourth of July.

6. The brace roots of a corn plant help support the stalk.

7. Most dent corn is used as feed for livestock.

8. A combine is a machine which picks, shucks, and shells corn in the field.

9. Corn that is not fed to livestock may be processed at mills or exported to other countries.



How Apples Appear

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Introduce students to the words "exaggeration" and "reality."
2. Help students understand the difference between exaggeration and reality as concepts.
3. Teach the students about John Chapman and his legend as Johnny Appleseed.
4. Teach the stages of apple growth and the correct sequence of stages.

Students:

1. Know the difference between exaggeration and reality.
2. Learn about John Chapman and his legend as "Johnny Appleseed."
3. Understand apple growth.
4. Place the stages of apple growth in the proper sequence.

Illinois Learning Standards: 2.A.1a; 2.A.1b; 2.B.1c; 3.C.1a; 4.A.1a; 12.A.1a; 12.B.1a; 15.C.1a; 16.B.1(W); 16.C.1a(W); 17.C.1a

Introduction:

Apples were introduced to America by early settlers who brought apple seeds with them. Seeds were carried westward by missionaries, traders, and native Americans. Today, there are approximately 7500 varieties of apples around the world. Only about 100 varieties are grown commercially in the U.S. and the top 10 varieties account for 90 percent of the crop. The most popular varieties are Red Delicious, Golden Delicious, Granny Smith, Macintosh, and Jonathan. There are even varieties named Strawberry, Winter Banana, Kid's Orange Red, Holstein, Liberty, and Hawaii! The varieties differ in flavor; they can be described as anything between sweet and tart. Apple producers combine genetic material to adjust the flavor, texture, growing season, and shape of the apple.

Thirty-six states in the United States, including Illinois, grow apples in commercial production. There are 20,000 apple growers that use about half-a-million acres to produce apples. Apple producers own or manage their orchards and then sell the fruit to consumers. Apple producers prune the trees, apply fertilizers and herbicides, mow the orchard, use machinery for harvesting and hauling the fruit, advertise, and sell the crop. Apples may also be processed into such things as apple cider, apple pie filling, and applesauce.

Materials Needed:

- "Johnny Appleseed – Exaggeration or Reality?" worksheet
- "Apple Growth Stages" worksheet
- "Apple Growth Cycle" worksheet
- A Johnny Appleseed book

Activity Outline:

1. Read the story of *Johnny Appleseed* by Aliki. (If this book is unavailable substitute another book about Johnny Appleseed.) Discuss with the students the meanings of "exaggeration" and "reality." Exaggeration is to go beyond the limits of truth. Reality is what is true, or what has actually happened. Ask students whether they believe the story of Johnny Appleseed is an exaggeration or reality (Did it really happen?).
2. Hand out the worksheet "Johnny Appleseed – Exaggeration or Reality?" to each student. Have the students fill in whether they believe the story is an exaggeration or reality. Then have the students write reasons why they believe the way they do.
3. For younger students - Have the students split up into two groups. One group for those who believe Johnny Appleseed was real and another group who believes Johnny Appleseed was an exaggerated character in a story. Have each group take turns giving reasons why they believe the way they do.
4. Next have the students work on "Apple Growth Stages" and the "Apple Growth Cycle" worksheet.

Discussion Questions:

1. What does the word exaggeration mean? What does reality mean?
2. Who was Johnny Appleseed? What does the legend say that he did?
3. What is an exaggeration of Johnny Appleseed? What is something that might be real about John Chapman?
4. What are some steps in the growth process of apples?
5. How are apple blossoms pollinated so apples will grow?

Related Activities:

1. Contact your county Farm Bureau® to get copies of Illinois Farm Bureau®'s *Ag Mag* 12 "Apple Blossom Treehouse Buddies." This informational magazine includes apple facts, apple history, activities, trivia, and career information.
2. Learn about the different parts of the apple. Do a study of the parts of an apple blossom.
3. Plant apple seeds and record the growth.
4. Learn about the different varieties of apples. Certain apples are best for certain purposes. Learn which are best for pies, applesauce, apple butter, apple juice, etc.
5. Read *How Do Apples Grow?* By Betsy Maestro.

To be used with:
How Apples Appear

Name: _____

Johnny Appleseed - Exaggeration or Reality?

1. What is an exaggeration?

2. Do you believe that Johnny Appleseed was real or an exaggeration? _____

3. Try to list at least three reasons why you believe what you do:

   1. _____

   2. _____

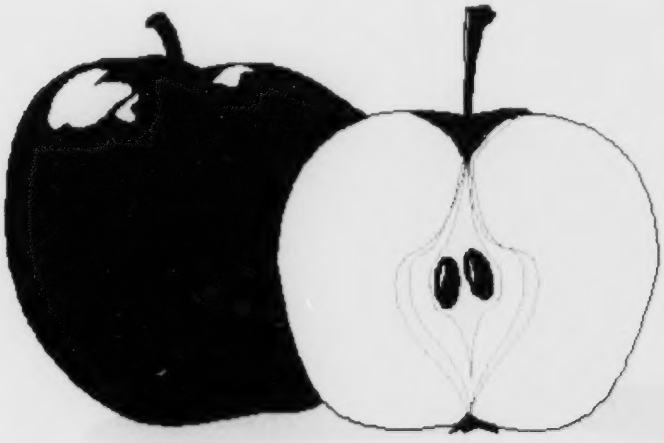
   3. _____

4. Make up three examples of something that would be an exaggeration.

   1. _____

   2. _____

   3. _____

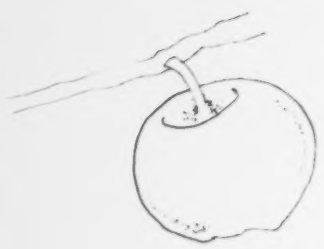


To be used with:
How Apples Appear

Cut-out Boxes

Apple Growth Stages

Cut out the boxes and place them in order on the Apple Growth Cycle worksheet.

The Apples Grow Bigger 	Buds & Leaves Begin to Grow on the Apple Tree	The Apples Begin to Grow	Bees Pollinate the Apple Blossoms
The Apple Tree Loses its Leaves	Apple Blosssoms Grow	The Blossoms' Petals Fall to the Ground	The Apples are Ripe & Ready to Pick

To be used with:
How Apples Appear

Name: _____

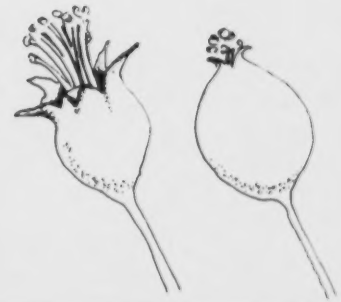
Apple Growth Cycle

1	2	3	4
5	6	7	8

To be used with:
How Apples Appear

Answer Key

Apple Growth Cycle

Buds & Leaves Begin to Grow on the Apple Tree	Apple Blosssoms Grow	Bees Pollinate the Apple Blossoms	The Apples Begin to Grow 
The Apples Grow Bigger	The Blossoms' Petals Fall to the Ground	The Apples are Ripe & Ready to Pick	The Apple Tree Loses its Leaves

Grapes are DiVine

Grade Level: K-3

Approximate Length of Activity: 30 minutes

Objectives:

Teacher:

1. Give students examples of how genes affect humans and plants.
2. Describe an adjective and then give examples.
3. Explain how technology affects food.
4. Teach the students about grape production.

Students:

1. Know about the effect of genes on humans and plants.
2. Learn the definition of an adjective.
3. Describe traits that genes affect in grapes using adjectives.
4. Learn about grape production.

Illinois Learning Standards: 3.C.1a; 4.B.1b; 12.A.1b; 12.C.1b; 13.B.1c; 13.B.1d

Introduction:

Genes are in every living organism. They determine characteristics about the organism such as color, height, and other characteristics! Every organism has between 50,000 and 100,000 genes. Genes are a segment of a DNA molecule in a chromosome. They determine characteristics by influencing chemical and physical processes during growth and aging. Studying genetics is important in agriculture for crop and livestock improvement as well as in other areas.

The genes of plants determine their physical uniqueness; characteristics such as height, color, length of growth, productivity, etc. We are able to grow plants with particular characteristics through genetics. Gene banks are places where many varieties of seeds are preserved. These gene banks help researchers develop new varieties of plants and find improvements.

At one time, all red grapes had seeds. The Agricultural Research Service of the United States Department of Agriculture created a red seedless grape called the Flame Seedless. Recently, they have developed a black seedless grape called the Black Emerald.

Grapes are berries that grow on woody vines. They are a fruit and have a high sugar content. They may be black, blue, golden, green, purple, red, or white. Grapes may be used by wineries, eaten fresh, dried into raisins, made into juice or jelly, or canned. Most of the grapes grown in the United States come from California. In 1997, 13,690,463,378 pounds of grapes were grown in the United States. Of those, 12,404,514,545 were grown in California! There are two types of grapes - European and North American. European grapes grow in areas with milder climates than the North American grapes.

In the winter, 12 to 18 inch cuttings called canes are cut from grapevines. They are buried in moist sand and stored in a cool place until spring. In the spring, the cuttings are planted in a nursery. The cuttings are planted in the vineyard and approximately one year later they develop into vines. The third and fourth year, the grapevines produce a partial crop and afterwards they produce a full crop. Vines may grow 15 to 80 pounds of grapes each year for up to 100 years. Grapes that are eaten fresh are harvested by cutting each cluster by the main stem. Grapes used by wineries or dried for raisins are harvested by hand or machine.

Materials Needed:

- "Grapes are Di*Vine*" worksheet
- Several varieties of grapes

Activity Outline:

1. Show the students some grapes and talk about how they are grown.
2. Tell the students that scientists have been able to produce seedless grapes through technology.
3. Tell the students that each of them has genes that determine traits like their eye color, hair color, height, and the ability to curl their tongues. Explain that plants, like grapes, have genes too. When scientists find a trait they like, they use genetics to find out how to produce that trait.
4. Discuss adjectives, or words that describe nouns. Give example adjectives such as brown, ancient, furry, cold, etc.
5. Set the different types of grapes on a table.
6. Ask the students for a few sample adjectives that may describe a particular type of grape. Tell the students that farmers and scientists have put many years into the development of certain traits in foods such as grapes. Talk about the development of seedless grapes.
7. Give each student a "Grapes are Di*Vine*" worksheet. Tell them that they will look at, smell, touch, and eat each type of grape and think of adjectives that describe them.
8. Compare adjectives that students chose.

Discussion Questions:

1. What is an adjective?
2. What do genes determine?
3. Did all of the grapes have seeds?

Related Activities:

1. Make grape juice in your classroom.
2. Study the nutritional value of fruit and brainstorm a list of fruits.

To be used with:
Grapes are DiVine

Name: _____

Grapes are DiVine

Use adjectives to describe the smell, color, and taste of different grape varieties. (Examples: purple, sweet, small, etc.) Use "yes" or "no" to record if the grape variety has seeds.

Type of Grape	Smell	Taste	Color	Seeds (yes/no)

Wheat is a Treat

Grade Level: K-3

Approximate Length Of Activity: One hour

Objectives:

Teacher:

1. Build an awareness of wheat grain being processed into food items.
2. Create an opportunity to use language art skills to request further information about the food processing of wheat grown in Illinois and other states.

Students:

1. Learn that wheat is processed into flour from which we make food items.
2. Create an opportunity to write business letters to request more information about food processing opportunities for wheat in Illinois and other states.

Illinois Learning Standards: 3.A.1; 3.B.1b; 3.C.1a; 5.A.1b; 5.B.1a

Introduction:

Wheat is the third largest crop in Illinois. Illinois wheat is used as livestock feed or made into flour for foods like cakes, cookies, crackers, and pretzels. Our wheat is also used for non-food items such as glue and pharmaceuticals. The farmer plants the tiny wheat kernels (another name for seeds) in the ground using a grain drill. The seed germinates (sprouts) and begins to grow into a plant, which consists of roots, a stem, long, slender leaves, and a head, which has kernels.

In June or July, the farmer combines the wheat and unloads the combine hopper into trucks or wagons. The farmer will haul the wheat to the country elevator. A country elevator has giant silos to store grain. The farmer receives payment for his wheat, and then the country elevator ships the wheat by truck, rail, or barge to a grain terminal. Next, the wheat is sold to various industries which make food or feed, or for shipment overseas.

The place where wheat is shipped to make flour is called the mill. The people who process the wheat are called millers. The wheat is put through a cleaning process to remove foreign matter (weed seeds, corn seeds, beans, stems). Rollers then press over the wheat kernels to break them into pieces, and they are shaken on screens to sift out the bran (the broken coat of the kernel) and germ (the part of wheat used to grow a new plant) not used in wheat flour. This is repeated three times to make a soft powdery substance we know as flour.

If whole wheat bread is what the mill wants to make, the bran and germ are added back in. Next the miller adds a special ingredient to the flour to whiten it, along with B-vitamins and iron for nutrients. The flour is shipped in bags to the bakery or to the grocery store.

Bakers like to use wheat flour because it contains a magical protein called gluten. (Wheat grown in Illinois does not have as much gluten as wheat grown in other places, so Illinois wheat is not used to make bread.) To make bread dough, active yeast, warm water, and other ingredients are added to the flour. The gluten traps the air bubbles the yeast releases and causes the dough to rise. Early elementary children may find the story, *The Little Red Hen* (enclosed) helpful in the above explanation or processing gluten into bread.

To collect more information about how wheat becomes flour, and about things we eat made from wheat flour, the children will write letters. Very early elementary students may write to one or two sources and make a class letter to the sources they choose. Second and third graders may be divided into eight groups, and write a letter to one of the eight resources provided to gather information. The teacher will provide a sample business letter format on overhead or chalkboard for students to use as a model when composing their own letters. The students will await replies and share the information gained with the class.

Materials Needed:

- Copy of "The Little Red Hen" by Paul Galdone
- "From Farm to Home" worksheet
- Picture of wheat or wheat sample
- Sample business letter
- Eight pieces of writing paper
- Eight business envelopes
- Eight first-class stamps
- Two to four frozen bread loaves
- Cookie sheet
- Flour
- Red and green food coloring (optional)
- One box of raisins
- 1/3 cup melted butter or margarine
- 350°F oven

Activity Outline:

1. Allow students to see a picture of wheat and read the worksheet or book, *The Little Red Hen*.
2. Have students complete the worksheet, "From Farm to Home."
3. Discuss with students that wheat becomes flour and can be made into bread.
4. Allow students to use pieces of thawed bread dough to make bread boas. Divide the dough into six to eight pieces and dip each piece in flour.

5. Give a piece of bread dough to each student. Let them roll each piece into the shape of a snake. The students can add raisins for eyes (and for decoration!).
6. Take one-third cup of melted margarine or butter and divide in half. Color one half green and the other half red using food coloring.
7. Use this to paint the bread boa like a snake.
8. Place bread boas on a cookie sheet and bake for 15 minutes at 350°F.
9. While bread boas are baking, assist students in using the Other Resources list to write a business letter (by group or class) to request other information concerning the use of wheat flour for food.
10. Address envelopes appropriately, send to the address indicated, and await responses.
11. Share the information with the class.

Discussion Question:

1. What processes do wheat go through at the mill?
2. Is wheat flour only used to make bread?
3. List four ways flour from wheat could be used to make wheat a treat.
4. What information did you learn from the places you wrote to?

Related Activities:

1. Write a letter to a friend or relative describing the making of bread boas.
2. Keep a chart recording which states responded to the request for information about the uses of wheat. Share this information with another class.

Other Resources:

1. *Farm Sources of Pizza*, information and activities focusing on pizza ingredients and where they come from. Contact your county Farm Bureau® to receive a copy.
2. *Wheat, Flour, & Food* videotape, Washington Wheat Commission, 905 West Riverside Avenue, Spokane, WA 99201-1093.
3. *Pasta: The Inside Story* videotape, North Dakota Wheat Commission, 4023 North State Street, Bismarck, ND 58501-0263, ph. (701) 328-5111.
4. *The Story of Wheat* (book word puzzles), North Dakota Wheat Commission, 4023 North State Street, Bismarck, ND 58501-0263, ph. (701) 328-5111.
5. *Walter and Wanda Grow Up* (booklet), North Dakota Wheat Commission, 4023 North State Street, Bismarck, ND 58501-0263, ph. (701) 328-5111.
6. *Nature's Best—Wheat Food* (teacher's guide, book and recipes), North Dakota Wheat Commission, 4023 North State Street, Bismarck, ND 58501-0263, ph. (701) 328-5111.
7. *A Kernel of Wheat*, North Dakota Wheat Commission, 4023 North State Street, Bismarck, ND 58501-0263, (701) 328-5111.
8. *Wheat, Flour and Food* (free book including history, kinds and nutrition), Kansas Wheat Commission, 2630 Claflin Rd., Manhattan, KS 66502-2743, ph. (913) 539-0255.
9. *About Wheat* (teacher packet), Kansas Wheat Commission, 2630 Claflin Rd., Manhattan, KS 66502-2743, ph. (913) 539-0255.
10. *Secrets of the Food Pyramid* videotape, Kansas Wheat Commission, 2630 Claflin Rd., Manhattan, KS 66502-2743, ph. (913) 539-0255.
11. *Introduction to Agriculture*, National Farm City Council, Inc., 225 Touhy Avenue, Park Ridge, IL 60068.
12. *The Day Jimmy's Boa Ate the Wash*, Hakes Noble, Trinka.

To be used with:
Wheat is a Treat

Name: _____

The Little Red Hen

Once there was a little red hen who lived in a big house with her friends — a goose, a cat, and a pig.

One day the little red hen found some grains of wheat and thought she'd put them to good use. "Who will help me plant this wheat?" she asked her friends.

"Not I," said the goose.

"Not I," said the cat.

"Not I," said the pig.

And so the little red hen planted the wheat herself.

Before long the wheat had sprouted and grown up tall and was ready for cutting. "Who will help me cut the wheat?" asked the little red hen.

"Not I," said the goose.

"Not I," said the cat.

"Not I," said the pig.

So the little red hen cut the wheat herself. "Who will help me take this wheat to the miller to be ground into flour?" the little red hen asked her friends.

"Not I," said the goose.

"Not I," said the cat.

"Not I," said the pig.

When the flour was ready, the little red hen carried it home.

"Who will help me make this flour into bread?" she asked her friends yet again.

"Not I," said the goose.

"Not I," said the cat.

"Not I," said the pig.

So the little red hen made the flour into dough. She shaped it and put it in the oven with the fire she had built all by herself. When the bread was toasty brown and smelling sweet, the hen took it from the oven.

"Who will help me eat this bread?" asked the little red hen.

"I will!" said the goose.

"I will!" said the cat.

"I will!" said the pig.

"Oh?" said the hen. "All by myself I planted the wheat and cut the wheat and carried it to the miller. All by myself I carried the flour and made the fire. I shaped the bread and baked it all by myself. And now *I* am going to eat it." And so she did, all by herself.

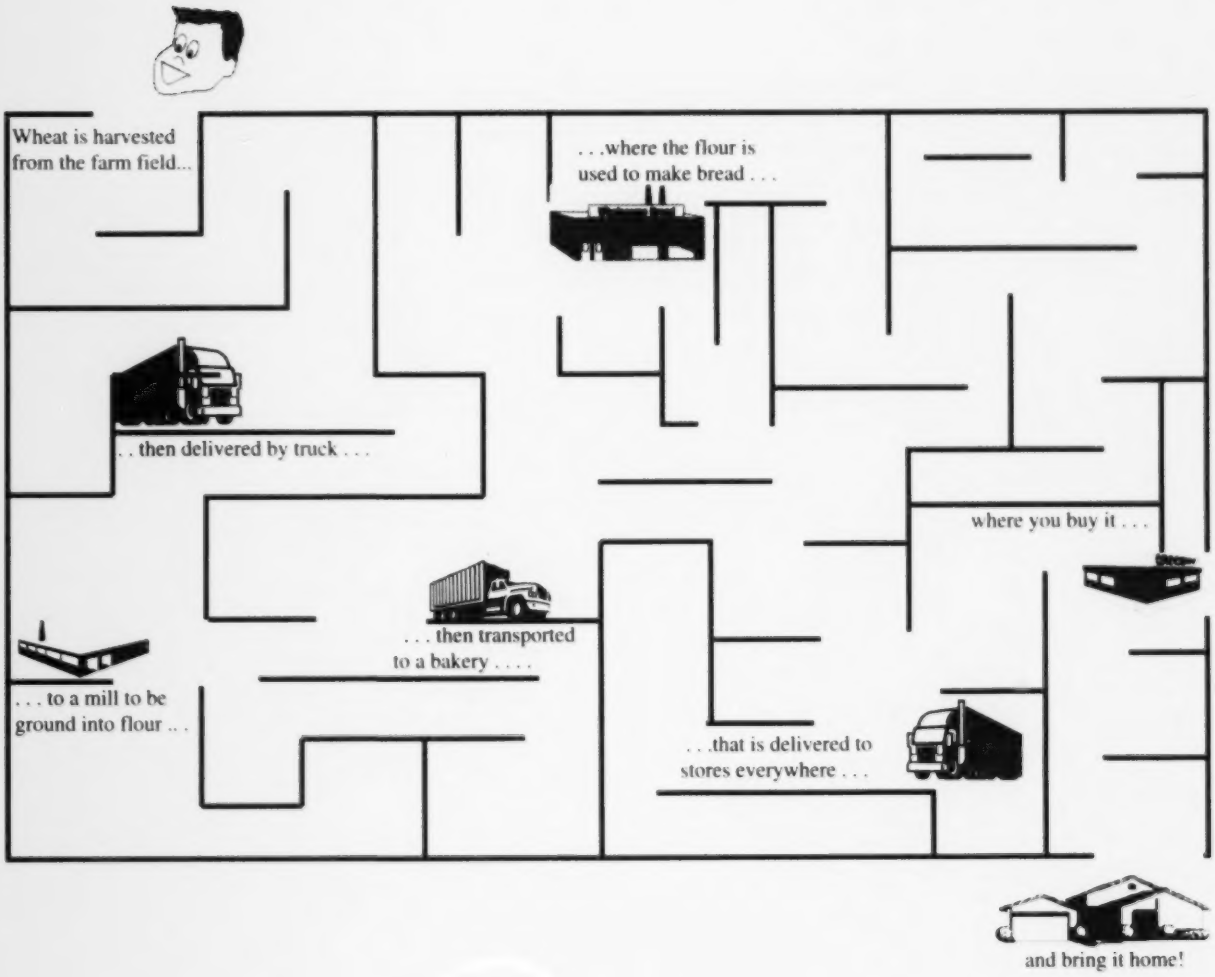
The Little Red Hen, by Paul Galdone, Seabury, 1973.

To be used with:
Wheat is a Treat

Name: _____

From Farm to Home

Help Eddie take the wheat from the farm to your home!

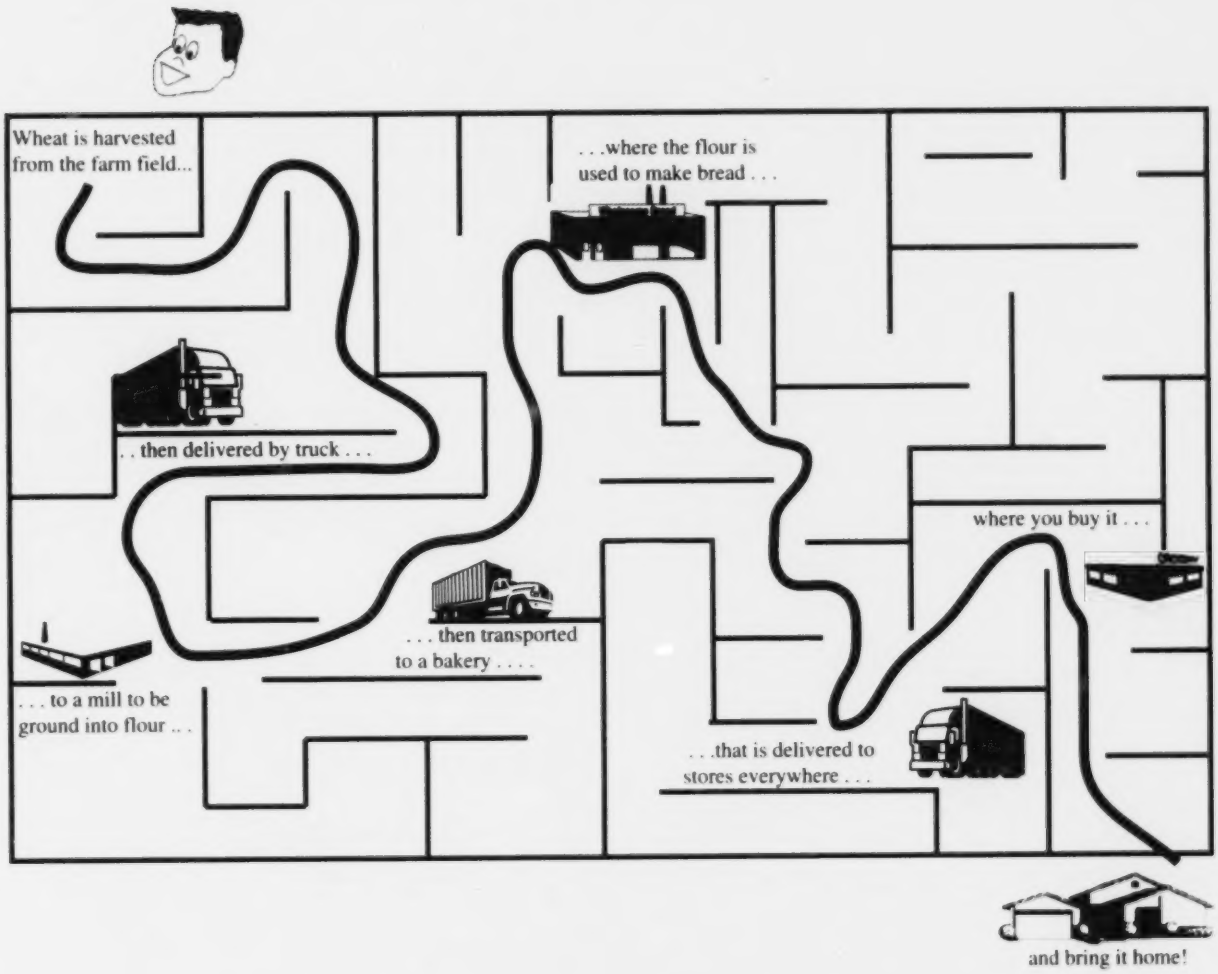

Wheat is harvested from the farm field...
. . .where the flour is used to make bread . . .
. . then delivered by truck . . .
where you buy it . . .
. . . then transported to a bakery . . . .
. . . to a mill to be ground into flour . . .
. . .that is delivered to stores everywhere . . .
and bring it home!

To be used with:
Wheat is a Treat

Answer Key

From Farm to Home

Help Eddie take the wheat from the farm to your home!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. . . to a mill to be ground into flour . . .
. . .that is delivered to stores everywhere . . .
and bring it home!

BEST COPY AVAILABLE

What a Bean Will Be

Grade Level: K-3

Approximate Length of Activity: 40 minutes

Objectives:

Teacher:

1. Spark the imagination of children to enhance creative writing.
2. Provide factual information which can be incorporated into creative writing.

Students:

1. Have a knowledge base of plant life and how beans grow.
2. Practice creative writing based on knowledge and imagination.

Illinois Learning Standards: 3.A.1; 3.C.1a; 4.A.1b; 4.B.1b

Introduction:

There are at least 260,000 species of plants in the world. They grow everywhere except areas which have permanent ice. Plants are beneficial to us because they give us oxygen, shelter, food, fiber, and many other products. Seeds need warmth, moisture, sunlight, and oxygen to grow. Most seeds grow best between 65°F and 85°F. Seeds receive their moisture from the ground. This moisture softens the seed coat and the growing parts are able to break through. A seed will rot if it receives too much water. A seed will germinate (sprout) slowly or not germinate if it receives too little water. Oxygen is used as the plant grows.

Plants will grow under poor conditions, such as too cool or too hot temperatures, lack of moisture or too much moisture, and lack of oxygen or carbon dioxide, but the plants may not be as healthy or as productive as those grown under optimum conditions. The growing environment for plants can be improved by irrigating, fertilizing the soil, planting crops during warm seasons, and planting crops that are compatible to the soil and environment. In this activity, students will set up a science area to grow beans under a variety of conditions and then chart the effects of the environment.

Materials Needed:

- *Jack and the Beanstalk* by Paul Galdone (or other authors)
- Lima beans
- Resealable bags
- Potting soil
- Writing paper and pencils

Activity Outline:

1. Read and discuss the story *Jack and the Beanstalk*.
2. Discuss what plants need in order to grow.
3. Have each student plant a lima bean in a resealable bag filled with soil.
4. Based on the story *Jack and the Beanstalk*, have the students use their imagination and write one sentence about how their bean will grow (tall, fast, enormous, etc.) Start the sentence with "My bean will grow...."
5. At a science area, plant and label beans growing under a variety of conditions such as, no light, no soil, no water, water only, light only, etc.
6. Ask groups of students to keep written observations of different growing conditions. Ask students to write a short paragraph on the results of their plant growth.

Discussion Questions:

1. What environmental conditions do most plants need to grow?
2. What would you like your plant to grow into?
3. What do most plants need to grow?
4. Do you think all seeds need the same conditions to grow into a healthy plant? Why or why not?
5. How can we improve the conditions so that plants have a better growing environment?

Related Activities:

1. Read related books about how plants grow. (*The Tiny Seed* by Eric Carle, *From Seed to Plant* by G. Gibbons, etc.)
2. Look at the parts of a bean plant under a microscope.
3. Draw and label the parts of a plant.
4. Plant a variety of seeds and chart the similarities and differences.

Pumpkin, Pumpkin

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Read a book to the students and test their comprehension.
2. Teach the life cycle of plants, particularly pumpkins.

Students:

1. Understand the life cycle of plants.
2. Be able to sequence the life cycle of a pumpkin.

Illinois Learning Standards: 4.A.1a; 4.A.1b; 4.A.1c; 4.B.1b; 12.A.1a

Introduction:

It takes 110 days, or almost four months, for a pumpkin vine to produce mature pumpkins. Timing is very important because pumpkins are frost-sensitive plants. Pumpkins should not be planted until the soil is warm and all danger of frost or severe chilling is past. Seeds should be planted four feet apart, allowing six feet of space between rows, to give them plenty of room to grow. Two to three pumpkins grow on a vine, and each vine may reach 15-20 feet in length. Not every seed will develop, so extra seeds need to be planted. Pumpkins need special nutrients from the soil, lots of sunshine and rain, and proper soil and air temperature to grow. Pumpkins are pollinated by bees. The size of a pumpkin depends on water, temperature, insects, diseases, pollination, fertility, soil type, plant population, and weeds.

Pumpkins are picked by hand when they are a deep, solid color and the rind is hard. Pumpkin producers must find a market for their crop. They can sell pumpkins at their home, at a market, to a store, or to a processing plant. Pumpkins should be stored in a cool, dry place to keep from rotting. They are used to make pumpkin butter, pies, custard, bread, cookies, and even soup!

Materials Needed:

- *Pumpkin, Pumpkin* by Jeanne Titherington
- White paper (8 1/2" x 11") cut in half horizontally
- Markers
- Crayons

Activity Outline:

1. Read *Pumpkin, Pumpkin* by Jeanne Titherington, Greenwillow Books, New York, 1986.
2. Discuss the life cycle of a pumpkin. Ask the students to tell you the sequence of steps in the life cycle. Write these steps in order on the chalkboard. Make sure each student will be able to view these steps from their desks.
3. Have the students write and illustrate a book showing the sequence of events in the life cycle of pumpkins. Have the students use one piece of paper for each step of the pumpkin's life cycle.
4. Have the students share their books in groups or as a class.

Discussion Questions:

1. Have you ever planted pumpkin seeds? If so, what happened?
2. What kind of seed was planted in the story?
3. What happened to the pumpkin seed after it sprouted?
4. If you had a pumpkin, what would you do with it?
5. What are some things that affect the growth of pumpkins?

Related Activities:

1. Estimate, measure, and graph the weight, circumference, and the number of seeds of different size pumpkins.
2. Plant pumpkin seeds.
3. Carve a pumpkin.

Other Resources:

1. The Illinois Farm Bureau® Ag in the Classroom program has developed an educational magazine called *Ag Mag* 9 that offers additional information about pumpkins. Please call your county Farm Bureau® for information about receiving copies for your classroom.
2. *The Biggest Pumpkin Ever* by Steve Kroll, Scholastic, New York, 1984.
3. *Picking Apples and Pumpkins* by Amy and Richard Hutchings, Scholastic, New York, 1994.

Grain...A Farm Hazard

Grade Level: K-3

Approximate Length of Activity: 30 minutes

Objectives:

Teacher:

1. Teach students about farm safety by learning about the mechanics of farm equipment.
2. Use a variety of media to teach farm safety (videos, brochures, discussion, demonstrations, and writing).
3. Give students practice with rhyming words and writing their own rhyming rap song.
4. Clearly explain the hazards of grain on a farm and how accidents can be prevented.

Students:

1. Learn about the hazards on a farm and the mechanics of farm equipment to determine why accidents happen.
2. Show an understanding of rhyming words by underlining them.
3. Create a farm safety rap song after learning about farm safety and seeing a sample song.
4. Observe demonstrations about grain hazards and relate it to farm safety.

Illinois Learning Standards: 22.A.1c; 22.B.1; 24.B.1

Introduction:

When grains such as corn, soybeans, and oats are harvested, they are placed into wagons, trucks, and storage bins. The grain moves from a large area into a small opening so a funnel is created by gravity. This funnel can pull people into the grain and cause them to suffocate, or die from lack of oxygen. It only takes two to four seconds to become helpless in a flow of grain. In 10 seconds, a person can be completely covered. Never play around grain equipment and never go in a grain wagon, truck, or bin.

Grain suffocation can also happen in grain bins where the grain is stored. Sometimes a crust, or bridge, forms over the grain and people think it is safe to walk on. There could be an open pocket underneath the crust that is not filled with grain. When a person steps on the crust, they can fall through, be covered by grain, and suffocate. Even adults do not have the strength to pull themselves out of grain before they are covered.

Materials Needed:

- Pictures of "Farm Machinery and Structures"
- "Farm Safety Rap Song" for each student
- Dry erase board/chalkboard
- Dry erase marker/chalk
- Plastic gallon milk jug
- Grain (corn seeds, bean seeds, wheat kernels)
- Small toy figure
- Large bowl
- Five-gallon bucket
- Balloon
- Needle (or something to pop balloon)
- Markers or crayons

Activity Outline:

1. Talk to your class about farm safety. You can contact your county Farm Bureau® to receive free copies of Illinois Farm Bureau®'s *Ag Mag* 15 entitled "Safety Sleuths." You may also want to show them the pictures of farm machinery and structures that are included. Ask them why accidents happen on farms.
2. Try this demonstration to show the students what it is like to be trapped in grain while it is emptied.
   a. Cut the bottom off a plastic gallon milk jug.
   b. Turn the jug upside down and fill it with grain while the cap is on.
   c. Place a small toy figure on top of the grain and place a large bowl under the jug.
   d. Remove the cap. As the grain quickly flows out of the jug, it will pull the toy figure along with it.
3. Try this demonstration to show the students what it is like to fall into grain that has a pocket of air under it.
   a. Inflate a balloon and place it at the bottom of a five-gallon bucket.
   b. Fill the bucket with grain and place a toy figure on top of the grain.
   c. Pop the balloon with a needle attached to a stick. As the balloon pops, the person will sink into the grain.
4. Optional extra activity: Try this demonstration to show students how heavy grain is and how hard it is to pull out when you are being submerged deeper and deeper.
   a. Attach a rope to a wooden disk.
   b. Place the wooden disk in a 30-gallon trash container and fill the trash container with grain.
   c. Ask the students to pull the disk out. The weight of the grain is more than most kids can pull.
5. The "Farm Safety Rap Song" was written by fifth graders from Allison-Bristow school in Iowa. They were able to perform it for Barbara Bush when she visited Iowa as the First Lady! Pass out copies of the rap song for your students.

6. Teach the students about rhyming words and then ask them to underline the rhyming words with various colors using markers or crayons.
7. Let the class make up their own farm safety rap. Write it on a dry erase board or the chalkboard.

Discussion Questions:

1. How can grain suffocation be prevented?
2. Why do people get trapped in grain while it is being unloaded?
3. Why do people get trapped in grain while it is being stored?
4. How do the demonstrations above relate to farm safety and how do they work?
5. What are rhyming words? Have the students give examples.

Related Activities:

1. Make a safety poster showing what not to do on farms.
2. Visit a farm to see the various machines and equipment that farmers use.
3. Contact one of the organizations listed in Other Resources for more information and lessons about farm safety.

Other Resources:

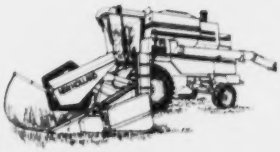
1. Contact your county Farm Bureau® to receive free copies of Illinois Farm Bureau®'s *Ag Mag* 15 "Safety Sleuths." This issue teaches about farm safety and provides fun activities to learn about farm safety.
2. "Tug of War with Grain" - A grain safety curriculum which uses flowing grain to explain force, resistance, pressure, velocity, and friction. (Junior High and High School)
3. Farm Safety 4 Just Kids—an organization which provides written materials, decals, and videos about farm safety. 110 S. Chestnut Ave., P. O. Box 458, Earlham, IA 50072, (515)758-2827, www.fs4jk.org.
4. Resource Units, TASK-Teaching Agricultural Safety to Kids, 221 North 48th, Quincy, IL 62301, 1-800-323-8275.
5. "Farm Safety, Family Style" Video, DowElanco, P. O. Box 5166, Cedar Rapids, IA 52406-5166.
6. "Safety Net" Video, "Farm Safety, A Second Chance" Video, and "Farm Safety for Kids" Video, Farm Safety 4 Just Kids, P. O. Box 458, Earlham, IA 60072, 1-800-423-5437.

To be used with:
Grain . . . A Farm Hazard

Name: _____

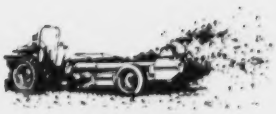
Farm Machinery and Structures

Plow

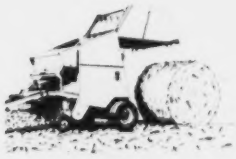


Combine

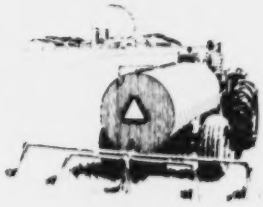
Irrigation System



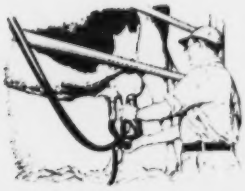
Spreader



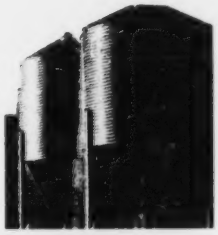
Hay Baler



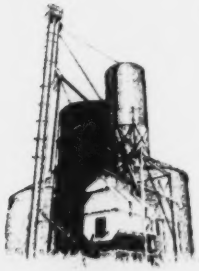
Sprayer



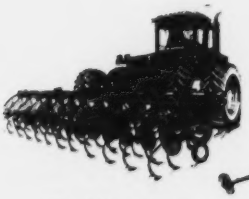
Milking Machine



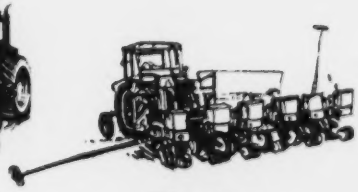
Grain Tank



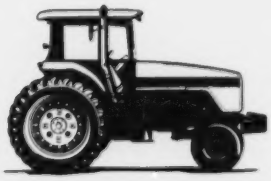
Silo



Cultivator



Planter



Tractor

To be used with:
Grain...A Farm Hazard

Name_____

Farm Safety Rap Song

The following rap song was written by fifth graders from Allison-Bristow school in Iowa. They were able to perform it for Barbara Bush when she visited Iowa as the First Lady.

Let me tell you about a story of a man and his grain.
Stepped in the bin, corn fell around him like rain.
It was a mistake, but it ain't no sin,
suffocation in the grain bin.
Tractor on the shoulder late at night.
Loaded grain wagons; it was quite a sight.
No use trying to keep it on the shoulder,
another farm vehicle tipped over.
This is a rap of farm safety for kids.
Listen up, you may learn something you never did.
If you don't stay alert,
Someone could really get hurt.

Find the rhyming words in the farm safety rap song above and underline them with matching colors. Write your own rap song using rhyming words (such as these below) and what you've learned about farm safety. Some words you might use are:

care	warning	caution	safety	heed
look	alert	mind	notice	observe
	watchfulness	advice	wariness	

Import / Export

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Teach students how to research information.
2. Educate students on writing skills and paragraph structure.

Students:

1. Understand the meaning of "import" and "export."
2. Name products that are imported and products which the U.S. exports.

Illinois Learning Standards: 3.A.1; 3.B.1a; 3.B.1b; 5.A.1b; 5.C.1a; 5.C.1b; 15.D.1a

Introduction:

To import means to bring products into a country from another country. Our country imports many products including cocoa, cinnamon, vanilla, olive oil, wool, coffee, various fruits, rubber, sugar, tea, machinery, cars, and clothing. Something that can be grown in the U.S. during one part of the year but not throughout the entire year is often imported during the off-season. This primarily includes certain fresh fruits and vegetables. Occasionally an agricultural product such as sugar will be imported to the U.S. in its raw form and then processed and packaged in America. In 1996 the United States imported $49.8 billion of agricultural products.

Export means to sell products to another country. The U.S. exports, or sells to other countries, wheat, soybeans, soy products, beef, pork, and other feed grains. These are just a few of the products we export. We are able to export these products because they can be grown, raised, or produced in the United States, and we have an abundance of them. In 1996, $69.7 billion worth of American agricultural products were exported. The countries which we export to the most are Japan, Canada, Korea, Mexico, China, Taiwan, and the Netherlands. The process of exporting and importing provides the United States with the goods we need and want that are not produced here. Exporting and importing also provide other countries with American goods.

Trade and marketing are very important to American agriculture. U.S. farmers grow much of the food that feeds the world. Sales of U.S. commodities to Japan, the European countries, Canada, and Mexico help to make America the largest exporter of agricultural commodities in the world. Sales of value-added products such as processed or packaged foods to other countries from the U.S. are increasing each year. Frozen vegetables and boxed cereal processed and packaged in the U.S. can now be found in supermarkets around the world.

Materials Needed:

- "The Illinois World of Agriculture" worksheet
- Resource materials - dictionaries, encyclopedias, etc.

Activity Outline:

1. Discuss the following terms with your class: wants, needs, import, export, country, trade, and products.
2. Hand out the sheet "The Illinois World of Agriculture" to each student. Ask the class to name some of the countries we export to. What products do we export to Egypt? New Zealand? Brazil? etc.
3. Ask each student to choose one of the exported products of the United States. Have each student write a paragraph about the chosen product. Help the students to begin their paragraphs with: The U.S. exports many products to other countries. One product that the U.S. exports is _____. Other information should be given in the paragraph, such as: Why is it exported? (Kindergarten classes may want to write this paragraph as a whole group rather than as individuals.)
4. Students can also write a paragraph using the word "imported," selecting a product that is imported, and stating why it is imported.

Discussion Questions:

1. What does import mean?
2. What does export mean?
3. Name two products the U.S. imports and why we import these products.
4. Name two products the U.S. exports and why we export these products.

Related Activities:

1. Find out with which countries we do the most importing and/or exporting.
2. Research how farming has changed in the past 100 years. How has this affected the importing and/or exporting of a product?

Other Resources:

Farm Facts, American Farm Bureau Federation, 225 Touhy Avenue, Park Ridge, IL 60068. Ph. (312) 399-5700, FAX (312) 399-5896.

To be used with:
Import/Export

Name _____

The Illinois World of Agriculture

Illinois has an important role in supplying food and farm products to countries all over the world. Because Illinois sends farm products and by-products to other countries, Illinois is called an "agricultural exporter." Do you know what it means to export a product? The definition of **export** is to sell a product to another country. The opposite of export is **import**. When the United States imports a product, it means that we are bringing products into the United States from a foreign country.

The state of Illinois ranks #3 in the United States in the amount of agricultural products we send to other countries. The lists below show the agricultural products that the U.S. exports to other countries. Some of these products exported are from Illinois!

Canada
Beef

Mexico
Corn
Soybeans
Soy Products

Brazil
Wheat

European Union
Wheat
Corn
Soybeans
Beef
Pork

Egypt
Wheat
Beef

South Africa
Corn

Eastern Europe
Wheat
Corn
Soybeans
Soy Products

India
Soybeans
Soy Products

Saudi Arabia
Corn
Beef

C.I.S. Commonwealth of Independent States
Wheat
Corn
Soybeans
Beef
Pork

South Korea
Corn
Soybeans

Japan
Corn
Soybeans
Wheat
Beef
Pork

Taiwan
Corn
Soybeans

Hong Kong
Pork

Australia
Wheat
Corn
Beef

New Zealand
Beef

China
Wheat

Hats Off to the Farmer

Grade Level: K-3

Approximate Length of Activity: 30 minutes

Objectives:

Teacher:

1. Introduce a story web.
2. Demonstrate how to write an informative paragraph using a story web.
3. Broaden students' knowledge of farming as a career.

Students:

1. Learn how to use a story web as an outline for writing.
2. Recognize that farming involves many jobs.

Illinois Learning Standards: 3.B.1a; 3.B.1b; 4.B.1b

Introduction:

The agriculture industry includes more than the farmer/producer. The farmer relies on many people to help him or her get food and other products to the consumer. Today's farmer is a well-educated person who knows how to mix proper diets of animals, take care of sick animals, repair machinery, protect the environment while raising animals and growing crops, and keep accurate accounting records to run the business. Indeed, a farmer does wear many hats!

The following describes the jobs of livestock farmers and crop farmers:

Livestock Farmer - Livestock farmers care for their animals by feeding them and keeping them healthy. Livestock farmers breed animals to genetically improve the quality of their animals. They keep accurate records of their animals. Livestock farmers may buy animals and bring them to their farm, or raise their own. They sell their animals for meat and other products.

Crop Farmer - Crop farmers grow things such as corn, soybeans, wheat, oats, and vegetables. They plant their crops, care for them, and harvest them. They may sell their crop at a market, take it to a grain elevator, or keep it to feed their livestock. Farmers use many types of machines to perform their tasks. Computers are one type of machine that is very helpful to farmers.

This lesson will help students understand how a story web - a pre-writing strategy - helps organize thoughts into a main focus with supporting details. An example titled "Hats Off to the Farmer" is included in this lesson.

Materials Needed:

- "Hats off to the Farmer" sheet
- An overhead projector or a chalkboard
- An overhead transparency marker or chalk

Activity Outline:

1. Begin a discussion of careers in farming by making a web on an overhead (or chalkboard, etc.). In the center circle write: "A farmer wears many hats."
2. Discuss the different kinds of jobs a farmer has to do, correlating "jobs a farmer does" to "hats a farmer wears." Refer to the sheet included – "Hats Off to the Farmer."
3. Fill in the web as the discussion develops.
4. As a class, write an informative paragraph using the information from the web.

Example:

(main focus)	A farmer wears many hats.
(supporting details)	He is a mechanic when he repairs his equipment.
	He is a veterinarian when he helps keep animals healthy.
(closing statement)	A farmer is busy doing many different jobs on his farm.

Discussion Questions:

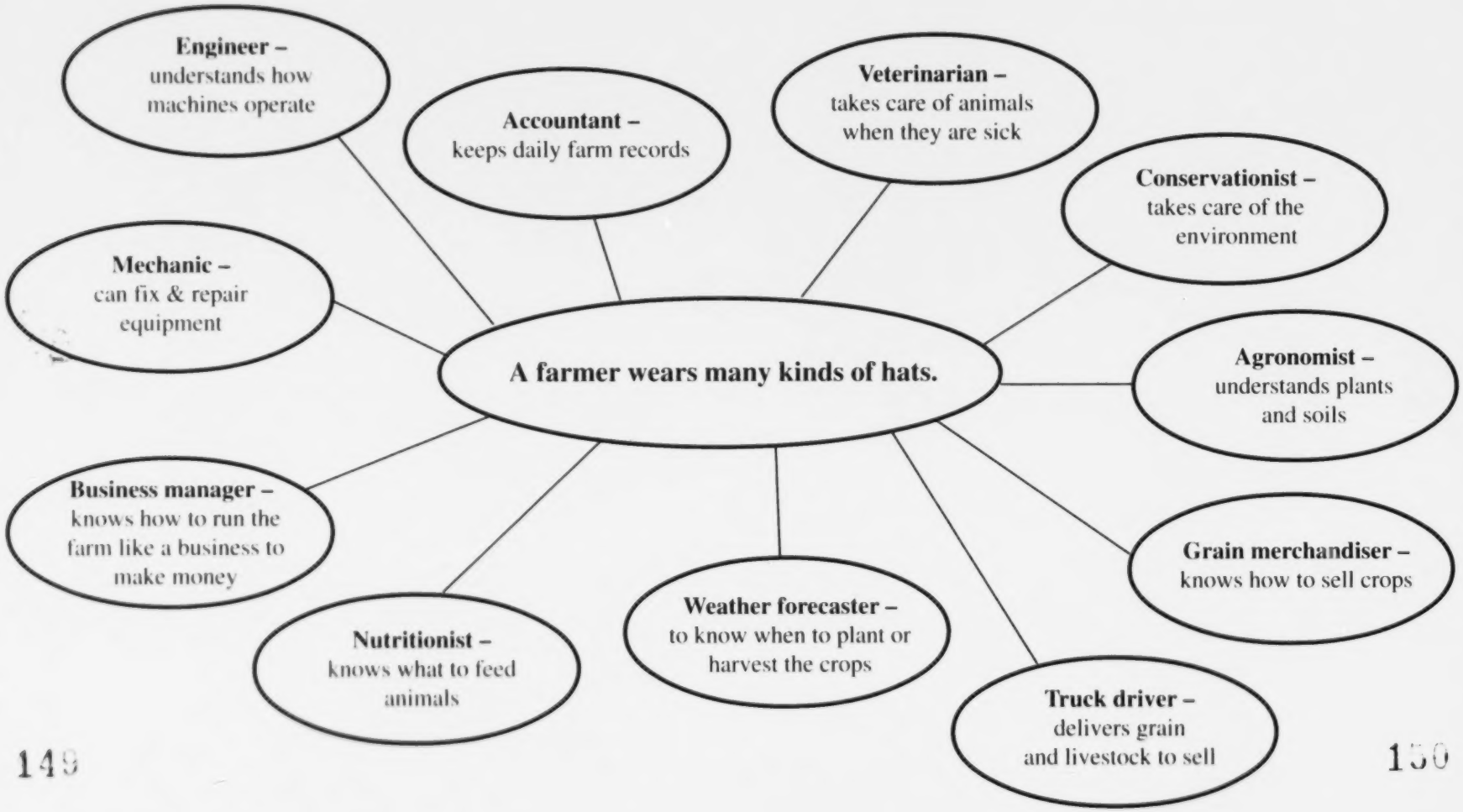
1. What part of the web gave us our main focus?
2. Where on the web did we get our supporting details?
3. How did the story web help you organize your thoughts into sentences?
4. What are some things that a farmer does?

Related Activities:

1. Change the center web to "Parents wear many hats."
2. Change the center web to an object. Have the students draw or write what they know about the object in the outer circles. Example: Fruit: Red: Apple: Used in making applesauce: Has seeds

To be used with:
Hats Off to the Farmer

"Hats Off to the Farmer"


A farmer wears many kinds of hats.
Engineer – understands how machines operate
Accountant – keeps daily farm records
Veterinarian – takes care of animals when they are sick
Conservationist – takes care of the environment
Mechanic – can fix & repair equipment
Agronomist – understands plants and soils
Business manager – knows how to run the farm like a business to make money
Grain merchandiser – knows how to sell crops
Nutritionist – knows what to feed animals
Weather forecaster – to know when to plant or harvest the crops
Truck driver – delivers grain and livestock to sell

Illinois Agriculture in Primary Colors

Grade Level: K-3

Approximate Length of Activity: 30-40 minutes

Objectives:

Teacher:

1. Help students recognize hidden words.
2. Assist students in categorizing words used in agriculture.

Students:

1. Find agriculture words in a word search.
2. Sort the words into one of three categories.
3. Follow directions, using the primary colors.

Illinois Learning Standards: 1.B.1a; 4.A.1c; 12.B.1a

Introduction:

Illinois is a major agricultural producer with a wide range of commodities. Illinois produces 1,130,000,000 bushels of corn, 80,000,000 pounds of apples, two-and-a-half million pounds of milk, 900,000,000 bushels of soybeans, and raises about five million hogs each year. Other Illinois products include wheat, oats, apples, pumpkins, vegetables, Christmas trees, sheep, and much more! Over 77 percent of land in Illinois is farmland. That's over 27.2 million acres! Crops and livestock are produced in different areas of the state depending on the temperature, precipitation, and physical features of the area. For example, fruit trees and berries are grown in southern Illinois rather than northern Illinois because the temperatures and frost dates are more appropriate for the crop. Developed areas are not used for crop and livestock production.

**Note: An acre is about the size of a football field. A bushel is the same as 128 cups or four pecks.*

Materials Needed:

- Copies of "Illinois Agriculture" word search
- A red, blue, and yellow crayon for every student or group

Activity Outline:

1. Pass out the "Illinois Agriculture" word search. Read the directions and the words on the page to the students.
2. Give assistance when needed. After the students find the hidden words, have them color the "animal" words red, the "plant" words yellow, and the "food" words blue.

Discussion Questions:

1. What are some of the products grown in Illinois?
2. Are you surprised at some of the products grown in Illinois? If so, what are they?
3. What are some products you wish could be grown in Illinois? Why?

Related Activities:

1. List other agriculture products and categorize them.
2. List farm animals and what the babies are called. (example: horse - foal, goat - kid, cow - calf, etc.)
3. Have children bring in pictures or examples of products grown in Illinois.
4. Have the students bring in grocery store advertisements and sort them into appropriate categories.

To be used with:
Illinois Agriculture In Primary Colors

Name: _____

Illinois Agriculture Search

Learn about Illinois Agriculture products!

1. Circle the hidden words.
2. Color the animal words red.
3. Color the plant words yellow.
4. Color the food products blue.

pig	corn	eggs
cow	soybeans	milk
horse	wheat	sausage
llama	pumpkins	hotdog
turkey	apples	cheese
sheep	oats	bread
catfish	ostrich	rabbit
watermelon		

w	a	t	e	r	m	e	l	o	n	i	s
h	w	i	w	a	b	c	q	l	b	c	v
e	s	o	y	b	e	a	n	s	a	h	y
a	c	k	m	b	b	r	e	a	d	m	c
t	o	a	i	i	h	e	n	u	l	p	a
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t	p	l	l	e	i	t	h	g	i	h	i
r	i	e	h	i	a	x	c	e	x	o	s
i	g	s	h	o	t	d	o	g	e	r	h
c	t	u	r	k	e	y	r	g	y	s	f
h	p	u	m	p	k	i	n	s	x	e	e

To be used with:
Illinois Agriculture In Primary Colors

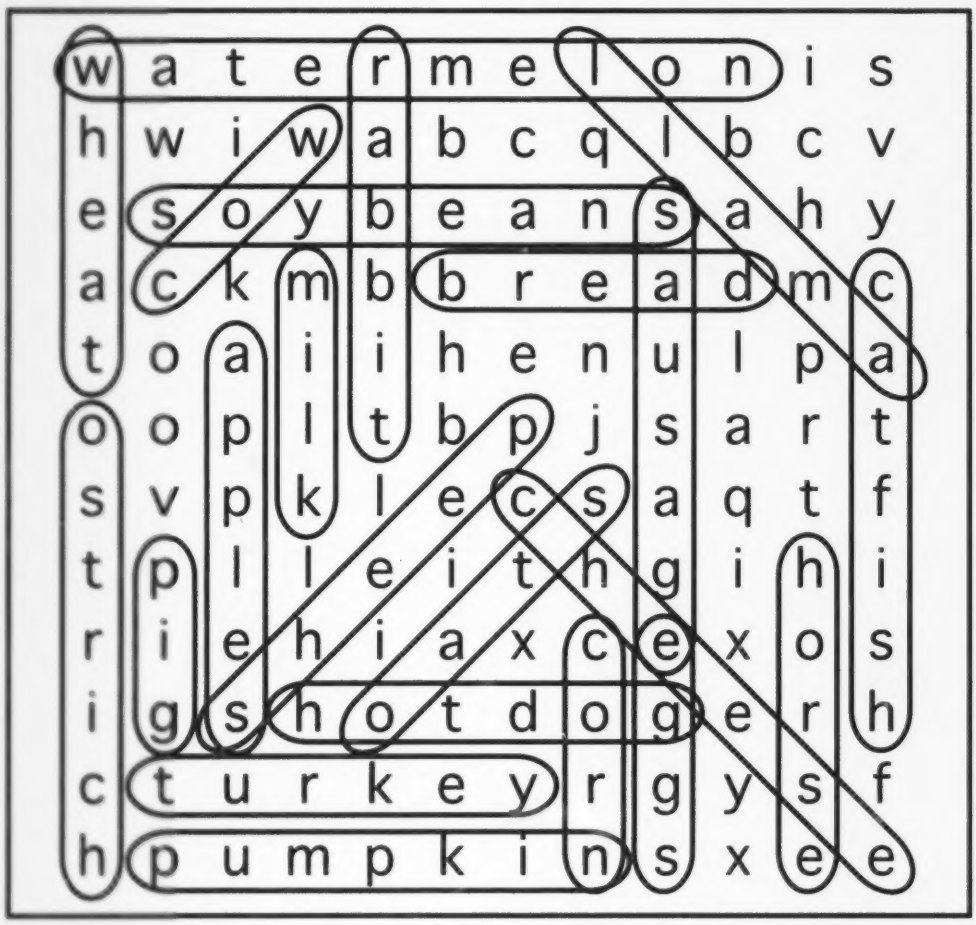
Answer Key

Illinois Agriculture Search

Learn about Illinois Agriculture products!

1. Circle the hidden words.
2. Color the animal words red.
3. Color the plant words yellow.
4. Color the food products blue.

pig
cow
horse
llama
turkey
sheep
catfish
watermelon
corn
soybeans
wheat
pumpkins
apples
oats
ostrich
eggs
milk
sausage
hotdog
cheese
bread
rabbit


w a t e r m e l o n i s
h w i w a b c q l b c v
e s o y b e a n s a h y
a c k m b b r e a d m c
t o a i i h e n u l p a
o o p l t b p j s a r t
s v p k l e c s a q t f
t p l l e i t h g i h i
r i e h i a x c e x o s
i g s h o t d o g e r h
c t u r k e y r g y s f
h p u m p k i n s x e e

Captain Of The Pond

Grade level: K-3

Approximate Length of Activity: 30 minutes

Objectives:

Teacher:

1. Illustrate the concept of physically changing a land formation to enhance growing conditions.
2. Teach and discuss geography and who can control it.

Students:

1. Learn that a change in physical land formation can assist growing conditions.
2. Understand geography and the effect of geography on society.

Illinois Learning Standards: 17.A.1a; 17.C.1a

Introduction:

Land and water are two valuable resources on earth. With increasing populations, it is important to use as much of the land as possible to produce goods for a hungry nation. Only about 1/32 of the earth has soil which is considered productive and fertile to support a crop. Some of the land is too dry to keep plants alive through the growing season. However, land formations (particularly rivers and lakes) can help enhance these "dry" lands. By rerouting water with a controlled method, the soils can be more productive. A farmer's business deals with taking appropriate care of the land, planting a crop, caring for the crop, and producing a high quality crop, while protecting the environment. Farmers have to make their fields (soil) be as productive as possible. Since soils in different regions have different needs, farmers use methods such as irrigation to make their field and crop better. In Illinois, over 300,000 acres (one acre is about the size of a football field) produces a crop by using irrigation. These 300,000 acres represent a little over one percent of the farmland in the state.

A good crop of corn or soybeans in Illinois needs at least 20 inches of water a year. Yet, almost every year, the corn and soybeans' water is limited to some degree by drought. There have been years where the summer rainfall is below normal, and there have been years where there are varying amounts of rainfall throughout the season. Due to these situations, more and

more farmers are installing irrigation systems. An irrigation system controls the application of water to dry lands by supplying water requirements of crops that have not received an adequate rainfall amount. Yet in order to construct an irrigation system, one needs to have an adequate source of water for the system. Many farmers use wells as a source of water, and some farmers pump their water from nearby streams (as long as the stream does not dry up in a dry year).

Materials Needed:

- Butter tub
- Round cake pan (twice the size of the butter tub)
- Soil
- Seeds (grass seeds or rye seeds, etc.)

Activity Outline:

Before conducting this activity it may be benefical to the students to conduct the activity in the Social Studies-Environmental Sciences lesson entitled "A Slice of Soil".

1. Hold a discussion with the class about various land formations and how farmers can only farm on land that does not have rivers running through it, mountains, volcanoes, or rocky, poor soil.
2. Discuss the meaning of irrigation with the students. Explain why it is used, that there are various methods available to irrigate, and what benefits irrigation provides.
3. The section demonstration involves showing the students how one type of irrigation would take place in a field. Take the butter tub and punch a few holes in the bottom and sides of the tub. Place the butter tub in the center of the cake pan.
4. Place soil around the butter tub and inside the cake pan.
5. Plant some seeds in the soil around the butter tub.
6. Fill three-fourths of the butter tub with water – this is irrigating the land. This demonstration is to give the students an idea of how irrigation is done. Check the soil moisture daily for further irrigation.

Discussion Questions:

1. Have a student hypothesize as to if...they water too much? ...they didn't water?
2. What other elements make plants grow?
3. Could you control that element?
4. Is irrigation successful?

Related Activities:

1. Set up three or four cake pans using different soil types such as topsoil, sandy soil, clay soil, etc.
2. Teach the "water cycle."
3. Make a terrarium.
4. Invite a farmer who irrigates land to your classroom.

Other Resources:

1. *Magic School Bus*, Waterworks.
2. *The Science Book of Water*, Ardley Hardcourt Brace Jovanovich.
3. *Follow the Water from Brook to Ocean*, Arthur Dorros, Harper Collins.
4. *Science in Our World*, Water, Knapp, Grolier.
5. *The Water Cycle*, Roy Richardson, Franklin Watts.
6. *Children's Atlas of the Environment*, Rand McNally.

String 'Em Up

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Expand the students' knowledge about the history of apples.
2. Teach the students about apple production in the United States.
3. Help students locate apple producing states on a map.

Students:

1. Learn how apples came to America.
2. Know about the production of apples in the United States.
3. Learn what states grow apples and where these states are located.

Illinois Learning Standards: 1.C.1d; 1.C.1f; 2.B.1a; 4.A.1a; 4.B.1b; 10.A.1b; 12.A.1a; 17.C.1a; 18.C.1; 25.A.1d; 26.B.1d

Introduction:

The Pilgrims brought the apple to the United States in 1620. While the Native Americans taught the early settlers how to grow corn and vegetables, the settlers taught the Native Americans how to grow apples with apple tree seeds, seedlings, and small trees. They used apples to make apple juice, apple cider, dried apples, apple butter, and vinegar.

During the long, cold winters, the settlers could not grow fresh fruits and vegetables. So instead, they found ways to preserve some of them. Apples were an easy fruit for the settlers to preserve. The apples were peeled and cored and then hung out to dry on a big net or string, hung high by trees or posts. The warm air would evaporate the water inside the apples, and they would be dried in two or three days. Through the years, American apple growers have developed new and improved varieties of fruit. In addition, researchers have introduced ways to preserve and use apples.

Today, the United States has 20,000 apple growers who produce about 260 million bushels of apples each year. About half-a-million acres in the U.S. are used to produce apples. The largest apple producing states are Washington, New York, Michigan, California, and Pennsylvania. Of the apples grown in the United States, 50 percent are sold fresh and 50 percent are made into applesauce, apple juice, and other apple products.

Some apple producers grow apples commercially and some grow them noncommercially. Apple producers who grow apples commercially own or manage their orchards and then sell the fruit to consumers. Apple producers prune the trees, apply fertilizers and herbicides, control rodents, mow the orchard, use machinery for harvesting and hauling the fruit, advertise, and sell the crop. Those who grow apples noncommercially may have a few trees in their yard and grow the apples for personal use.

Materials Needed:

- *The Amazing Apple Book*, by Addison-Wesley or *How Do Apples Grow?* by Betsy Maestro, Harper Collins Publishing Co. or *The Seasons of Arnold's Apple Tree* by Gail Gibbons, Harcourt Brace.
- Apples - red, yellow, and green varieties
- 3 bowls
- Various cereals – Fruit Loops®, Cheerios®, or Apple Jacks®
- A knife
- String or yarn
- Clothespins (optional)
- Wire hangers (optional)

Activity Outline:

1. Read one of the books in the Materials Needed list above to familiarize students with apples and apple growth.
2. Discuss what occurs in the book.
3. Write these statistics of percentages of apple production in the U.S. on the chalkboard:

Washington	48.4%
New York	10.9%
Michigan	10.2%
California	9.3%
Pennsylvania	5.1%

   a. Ask the students why these states might have the highest percentages of apple production. (weather, soil)
   b. Ask the students to point out which state produces the most apples in the U.S. (Answer – Washington) Ask the students which state produces the least amount of apples of those listed. (Answer - Pennsylvania)
4. Have the students dry apples just like the settlers did. The teacher should wash all of the apples and core them. Then the teacher should cut the apples into rings about one-fourth inch thick.
5. Make apple rings for all three colors of apples. Place the apple rings in the bowls, one bowl for each color. Also set out the cereal in a bowl.

6. Pass out pieces of string or yarn so each student has one. The strings should be long enough that the student could wear them as a necklace if they wanted to.
7. Have the students take turns stringing up their apples to dry. Each student should choose four apple slices and some "spacers" (the cereal). The apple slices should not touch one another so the cereal spacers should keep the apple slices from touching.
8. After stringing up their apple slices, the students should tie a knot with the two loose ends of the string. This way nothing will fall off of the strings.
9. Use the clothespins to hold the strings on the wire hangers. Make sure the string is taut so the apples do not touch one another.
10. Hang the hangers in a high space so no one will accidentally bump them. Hang them until the apples are dried.
11. Once the apples are dried the students may eat their creation or wear it.

Discussion Questions:

1. Who brought the apple to the United States?
2. How did the settlers preserve apples for the winter?
3. What are some states that produce apples?
4. What types of foods are made with apples?

Related Activities:

1. Make applesauce as a class.
2. Go on a field trip to an apple orchard.
3. Read and discuss other books about apples.

Say Cheese!

Grade Level: K-3

Approximate Length of Activity: One hour

Objectives:

Teacher:

1. Give students a general understanding of product technology and its importance to our food system over the years.
2. Explain why cheese-making is a technological process and assist the students in a cheese-making activity.

Students:

1. Describe the process of cheese-making from cow to store.
2. Gain a general understanding of product technology.
3. Relate the history of cheese-making to cheese-making today.

Illinois Learning Standards: 12.A.1a; 12.B.1a

Introduction:

Production of cheese starts with the dairy cow. After a dairy cow gives birth, she is able to produce milk. Dairy cows are milked two to three times a day and their milk travels from the milking machine to a cooling tank. A dairy plant sends a refrigerated truck to the dairy farm every day and the refrigerated truck transports the milk to a cheese factory or to a dairy plant. At the cheese factory, the milk is pumped into a storage silo and then tested to make sure it is clean and wholesome. After the milk is cooled, it is pumped into a stainless steel vat where starter cultures are added. The starter is stirred through the milk with mechanical paddles. Rennet, a liquid enzyme, is added to the milk as a thickener. The milk rests for 30 minutes as curds form. After the curds form, knives cut the curd into small cubes and a clear liquid called whey oozes from the cubes. The whey drains from the curds when the cheese is placed on a finishing table. The curds knit into a solid mass as they rest. Next, the curds are cut and fed through a cheese mill. The mill cuts the cheese again and they are put in a mixer with hot water. This causes the cheese to melt so it can be placed in forms, or molds. When the cheese is formed, it is placed in a salt brine bath so it can develop flavor. Finally, the cheese is wrapped and packaged.

Cheese-making, one of the earliest forms of biotechnology, involves chemical reactions that cause curd formation from liquid milk. When making cheese living organisms (bacteria and fungi) are added to the milk. During their growth, the organisms metabolize the curd, creating chemical changes that result in cheeses of different textures and tastes, such as Swiss cheese and bleu cheese. Various types of cheese also depend on the kind of milk used, the amount of fat in the milk, the coagulation methods, cutting, cooking, curd formation, and the amount of salting.

Did you know that farmers discovered biotechnology thousands of years ago? About 8000 B.C., the first farmers decided to stay in one place and grow certain plants. Since then, people have continued to produce better, safer, and more food to support themselves and the world. Around 1800, people first started using bacteria to create new and different foods. When bacteria grows in certain foods, such as cheese, it causes desirable flavors and textures. In 1882, David Jacks, a Scotsman from Monterey, named his cheese Monterey Jack. He was the first person to sell cheese commercially in California.

In the activity below, classrooms will use an enzyme called chymosin to break bonds in milk and form curds. Chymosin is extracted, purified, and concentrated from microorganisms that carry genes coding for chymosin.

Materials Needed:

- Cheese Kits - For free vials of chymosin contact Kathi Jones, USU Biotechnology Center, 435-797-2906. Kits for 25 samples or large scale, currently free of charge.
- Whole milk
- Buttermilk
- Mixing bowl and spoon
- Small plastic disposable cups
- Medicine dropper or disposable pipettes
- Measuring cups and spoons
- Wooden popsicle sticks
- Gauze or cheesecloth
- Crock pot
- Timer
- Thermometer

Activity Outline:

Handy Information:

- Salt may be added to milk mixture before the experiment for a better tasting cheese, or salt the curds individually after the cheese is made.
- Wooden popsicle sticks can be used for this experiment or coffee stir sticks are also a good choice. Also small plastic cups can be used to warm the milk in.
- One cheese sample takes five minutes to make if the cups of milk are already poured.

1. Divide the children into small groups to take turns doing this activity.
2. Prepare milk mixture. The milk mixture is three parts milk to one part buttermilk.
3. Mix the milk and buttermilk in a bowl or container.
4. Pour two teaspoons of the milk mixture in each disposable cup, one for each student.
5. Prepare water bath by putting warm tap water in a crock pot about two or three inches high, adjusting the temperature to 41°C (106°F).
6. When the water is warm enough, have the students hold their cup just below the water line in the crock pot to warm the milk and swirl gently for one minute. Be careful not to get any water in the experiment cup.
7. The teacher should add 1 drop of diluted chymosin and swirl the cup gently for about ten seconds to mix it up. Put the cup back in the crock pot. Hold the cup in the crock pot to incubate. (The less movement the better for the rest of the experiment.)
8. Hold the cup in the crock pot for about 30 seconds. Tilt the cup. What do you see? Is the milk getting thicker? It should be. Timing is not critical; however, it is better to lengthen rather than shorten incubation.
9. Put the cup back into the crock pot and hold for 60 seconds more. Tilt the cup after 30 seconds and again after one minute to check for thickening. The milk should look like thick yogurt. If it is still liquid, add one more drop of the enzyme. If it looks like curdled milk, it is okay to proceed.
10. Keeping the cup in the crock pot and using the wooden popsicle stick, draw a tic-tac-toe pattern in the bottom of the cup. The mixture should look like unstirred yogurt. You will not see the cuts you have made until further incubation. Do not cut it further.
11. After 30 more seconds, look to see if cuts are visible. A liquid should be forming where you cut the curd with the wooden popsicle stick.
12. Gently stir the curd with the wooden popsicle stick and put the cup back in the crock pot for an additional 30 seconds. The thick white part is the curd and the watery liquid is the whey. If students do not see where the cuts were made at this point, incubate a little longer. The longer the sample is left in the water bath, the firmer the curd and the more whey is expressed. This timing is another source of variability.
13. Tell the students to hold one hand over a wastebasket or sink. Make a pocket of the gauze in their hand and pour the mixture into the pocket, letting the whey drain from cheese curd.
14. Twist the top of the gauze closed and gently squeeze the bottom to strain the whey.
15. Students can eat the cheese curd. They have just made cottage cheese!

Discussion Questions:

1. Describe the process of cheese-making from cow to store.
2. Since cheese-making is a biotechnological process and has been around a long time, is biotechnology new? (Students should realize that biotechnology has been going on for a long time, although the scientific processes were not understood.)

Related Activities:

1. Try different types of cheese and compare their taste and texture.
2. Research cheese production in the U.S.
   Illinois produces 115 million pounds of cheese each year. How many dairy cows are used for this?
   How much cheese do other states produce?

Other Resources:

1. The Illinois Farm Bureau® produces an educational magazine called *Ag Mag*. *Ag Mag* 14 focuses on dairy topics such as dairy cows, milking, dairy nutrition, ice cream, cheese, butter, and career information. Contact your county Farm Bureau® to receive free copies for your classroom.
2. *Extra Cheese, Please! Mozzarella's Journey from Cow to Pizza* by Cris Peterson.
3. *Just Say Cheese Please!* and *Cheese Can Do* brochures from the Southwest Dairy Museum, Inc., P.O. Box 936, Sulphur Springs, Texas 75483, (903) 439-MILK.

Soybeans – Those Amazing Little Beans

Grade Level: K-3

Approximate Length of Activity: 35-40 minutes

Objectives:

Teacher:

1. Help students understand what a soybean is and how useful the Illinois crop is for everyone—not just farmers.
2. Help students identify important dates in the history of the soybean.
3. Teach students about products made with soybeans.

Students:

1. Identify important dates in the history of the soybean and place those dates in chronological order on a time line.
2. Name products that are made with soybeans.

Illinois Learning Standards: 13.B.1c; 13.B.1d; 15.D.1a; 16.C.1a(W); 16.C.1b(W)

Introduction:

Soybeans are produced for human food, consumer and industrial products, and livestock feed. Soybeans are one of the nation's most fascinating and versatile edible plants. In 1998, Illinois farmers harvested 10,700,000 acres of soybeans. These 10,700,000 acres produced 469,000,000 bushels of soybeans. From foods to ink, from paints to plastics, soybeans have hundreds of everyday uses. Some of those products are probably in your kitchen or garage right now!

Even though soybeans have been a major food crop in China for over 5000 years, they weren't grown in our country until the 1800s. At first, the soybeans were small, and their uses few until a scientist named George Washington Carver began finding more and more uses for the soybean.

Soybeans touch our lives hundreds of times a day when we eat, read a newspaper, get into our cars, and even when we open our front doors. Soybeans are often called magic beans because they can be made into so many products. Some of the products made from soybeans include: cereal, cooking oil, chocolate, hot dogs, candy, baby food, flour, soup, ice cream, vitamins, cookies, printing inks, soap, shampoo, fabric softener, paints, diesel fuel, plastics, cosmetics, and pet food.

Some other uses for soybeans that biotechnologists have discovered are biodiesel fuel, soybean crayons, soy ink, and building materials.

Biodiesel Fuel – Biodiesel fuel, which can be used in any diesel engine, is made from soybean oil. This fuel is a clean-burning, biodegradable fuel that can help cities meet federal clean air standards. Unlike petroleum diesel, biodiesel fuel emits a much lower amount of pollutants, is sulfur-free, and does not produce explosive vapors. Biodiesel also provides similar horsepower, torque, and miles per gallon as petroleum diesel.

Soybean Crayons – Soybean crayons are made with soybean oil instead of petroleum-based paraffin wax. Soybean crayons provide brighter and smoother colors that don't flake. These crayons can be found under the Prang Fun-Pro Crayons name at K-Mart®, Wal-Mart®, Staples®, OfficeMax®, and Target®.

Soy Ink – Soy ink is made with varying amounts of soybean oil. Newspapers, commercial printers, and government agencies are using soy ink because it prints more paper per pound and offers better color reproduction. In fact, over 90% of all U.S. daily newspapers are printed using soy ink.

Building Materials – Environ™ is a surface material made with soy flour and recycled paper. A fourth grade student from Minnesota contributed to the creation of Environ™. They developed a board that is similar to wood, harder than oak, and lighter than granite. Environ™ can be used in countertops, furniture, plaques, and much more.

Materials Needed:

- "Soybean Crossword Craze" worksheet for each student
- "The History of the Soybean" worksheet

Activity Outline:

1. Discuss the importance of time lines and why they are a useful tool.
2. Ask the students if they know of any products made with soybeans. Lead them in a discussion about soybean uses and some new biotechnological products made with soybeans.
3. Have students complete the worksheet "Soybean Crossword Craze" to become familiar with some products made with soybeans.
4. Have the students complete the worksheet "The History of the Soybean."

Discussion Questions:

1. How did soybeans become such an important commodity for Illinois farmers?
2. Name some soybean products.
3. Name some important events in the history of the soybean.
4. How does technology relate to some of the new uses for soybeans?

Related Activities:

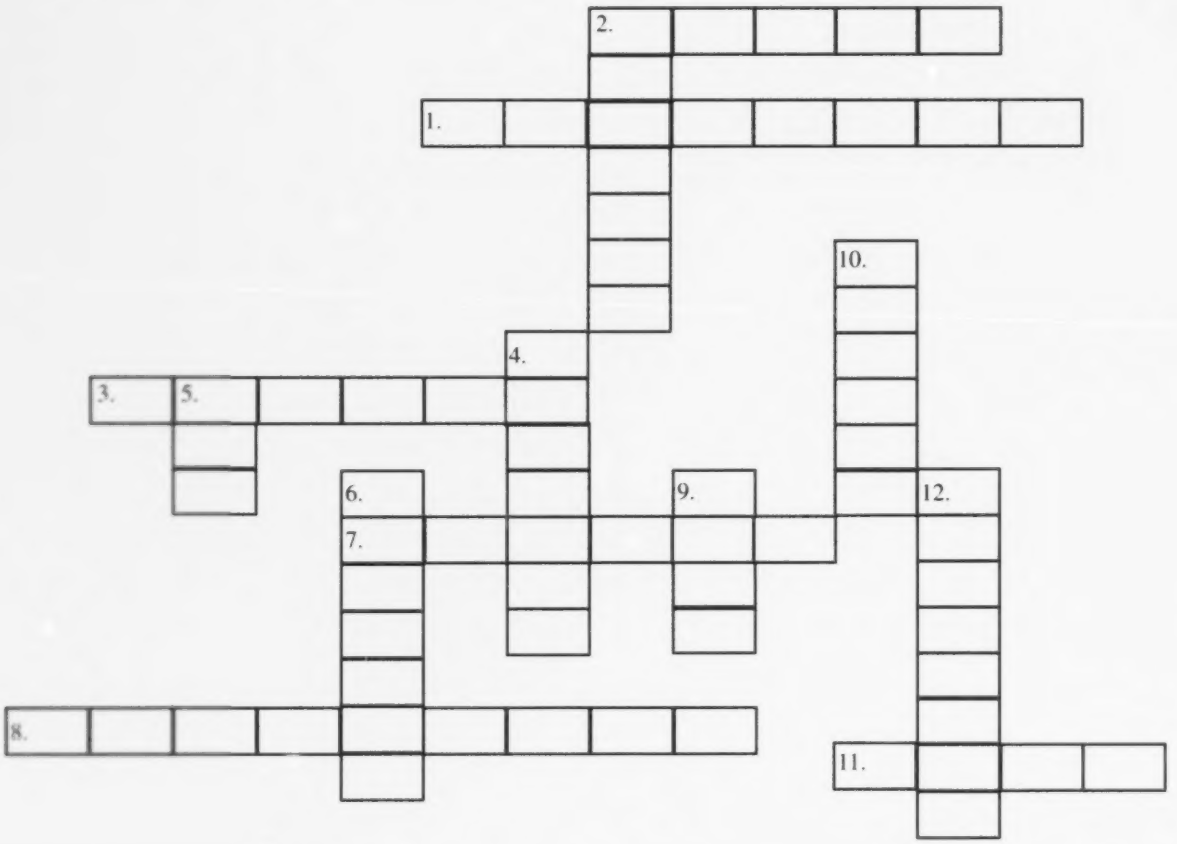
1. Contact your local county Farm Bureau® to receive free copies of Illinois Farm Bureau®'s *Ag Mag* 10 on soybeans. *Ag Mag* 10, entitled "Imagine a Bean...It's the Coolest Thing," has more information on soybeans and activities for your classroom.
2. Contact the Illinois Soybean Association, 1605 Commerce Parkway, Bloomington, IL 61704, (309) 663-7692. Representatives there can provide additional classroom materials for incorporating soybean lessons and activities into your curriculum.
3. Contact your local county Farm Bureau® to provide a soybean farmer to serve as a guest speaker for your classroom.
4. Write a three-paragraph essay about the importance of soybeans to the U.S.

To be used with:
Soybeans- Those Amazing Little Beans

Name: _____

Soybean Crossword Craze

Read the clues below to figure out which soybean products go in the crossword puzzle.



Down

2. You feed your dog or cat with this type of food.
4. This product is used in your bicycle helmet to protect your head.
5. Soybeans are used in this industrial product to print newspapers.
6. This product makes our hair clean and shiny.
9. We use this to wash our hands, wash our clothes, and to wash our dishes.
10. Eat this for breakfast to start your day off right.
12. This food is for very young people. It contains soybeans to provide protein.

Across

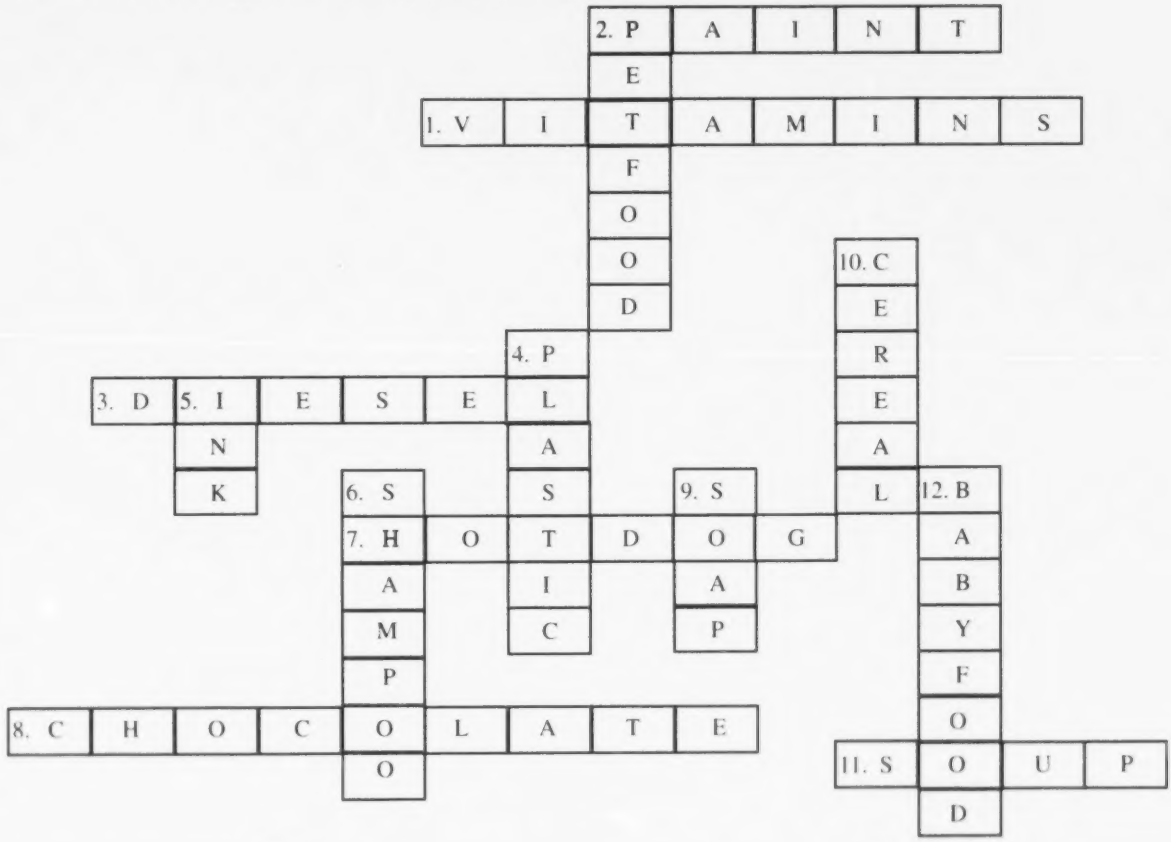
1. Take these every day to make sure you get your daily nutrients.
2. A coat of this product will freshen up a room.
3. This fuel is environmentally friendly.
7. Lots of people eat this food at a ballgame.
8. This is used to make many sweets and treats that we love to eat!
11. When you're sick this will make you feel better.

To be used with:
Soybeans- Those Amazing Little Beans

Answer Key

Soybean Crossword Craze

Read the clues below to figure out which soybean products go in the crossword puzzle.



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To be used with:
Soybeans- Those Amazing Little Beans

Name: _____

The History of the Soybean

Directions – Listed below are 15 different dates that are important in the history of soybeans. Put the dates in the proper order by placing a 1 in front of the event that happened first, a 2 in front of the next event, and so on.

_____ 1904 – George Washington Carver discovers that soybeans are a valuable source of protein and oil.

_____ 164 BC – Soybean curd (tofu) is invented.

_____ 1995 – The "New England Journal of Medicine" reports that soybean protein consumption reduces LDL cholesterol (the bad cholesterol) by 12.9% and reduces total cholesterol by 9.3%.

_____ 8000 BC – Animals are domesticated in the Middle East marking the birth of agriculture.

_____ 1922 – The first U.S. soybean processing plant opens in Decatur, Illinois by A.E. Staley.

_____ 1990 – The U.S. grows 51% of the world's soybeans.

_____ 1850 – Civil war soldiers roast soybeans in place of coffee beans when coffee beans become scarce during the war.

_____ 700 BC – Chinese make soy sauce.

_____ 1804 – Soybeans come to America.

_____ 1929 – Soybean pioneer William J. Morse spends two years in China gathering more than 10,000 soybean varieties for U.S. researchers to study.

_____ 2000 BC – Soybeans are first planted in China for food.

_____ 1997 – Prang® starts marketing crayons made from soybeans for back-to-school sales.

_____ 1987 – Soy ink is used to print newspapers.

_____ 1940 – Henry Ford demonstrates the strength of the soybean plastic he has developed by taking an ax to the plastic on one of his cars.

_____ 1860s – U.S. farmers begin to grow soybeans for soy sauce and cattle feed.

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To be used with:
Soybeans- Those Amazing Little Beans

Answer Key

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7 1860s – U.S. farmers begin to grow soybeans for soy sauce and cattle feed.

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A Slice of Soil

Grade Level: K-3

Approximate Length of Activity: 30 minutes

Objectives:

Teacher:

1. Teach the importance of the earth's surface.
2. Teach the value of the soil on Earth.

Students:

1. Learn how much land exists on Earth.
2. Learn how much of the land is usable for growing food and fiber.

Illinois Learning Standards: 15.C.1b; 17.A.1a; 17.C.1a

Introduction:

One of the most important natural resources that covers much of the earth's land surface is soil. Most life on earth depends upon the soil as a direct or indirect source of food. Plants are rooted in the soil and obtain nutrients (nourishing substances) from it. Animals get nutrients from plants or from animals that eat plants. The contents of soil change constantly, and there are many different kinds of soils. It forms very slowly and is destroyed easily, so it must be conserved in order to continue to support life. We are unable to use all of the earth's surface for food production because some of it is covered by deserts, swamps, ice, mountains, or other areas not suitable for plant growth.

Soil conservationists and farmers work to ensure the wise use of soil. Wise use of farmland involves maintaining a high level of nutrients and organic matter in cultivated soils. Farmers add organic matter to the soil by plowing under certain green plants. They also add fertilizers and rotate crops to replace nutrients that leaching and growing plants remove. Farmers also plow and plant their fields in ways that control soil erosion.

Livestock farmers also are careful to control soil erosion on their land by limiting the grazing on their land. Lands that have been overgrazed also suffer from erosion. Ranchers conserve grazing lands by limiting the time that their herds graze in one area. Forest lands must also be protected from erosion. Foresters leave unusable branches and other parts of trees on the forest floor to add organic matter to the soil.

Our food producing land remains the same and yet the world population continues to grow. Consequently, each person's food portion becomes smaller and smaller. It is the responsibility of each generation to use the soil wisely to ensure the future. The following demonstration will show how little of the earth's surface is actually used for food production as compared to growing populations.

Materials Needed:

- Globe or map
- Apple
- Knife
- If available, pictures of land formations including groves, mountains, fields, deserts, etc.

Activity Outline:

1. At desks or group settings, discuss our planet Earth. Discuss uses of our land and land that might not be usable.
2. Bring out the globe or map and show water and land. Discuss the need for both. When this seems clear, go into the lesson.
3. Cut apple into four equal parts — three parts represent the oceans of the world, and one part represents total land areas. Plants that produce food cannot grow in water. Therefore, set three quarters aside.
4. Cut the land section in half lengthwise. Now you have two 1/8th pieces. One section represents land such as deserts, swamps, Antarctic, arctic, and mountain regions. The other 1/8th represents land where man can live but may not grow food.
5. Slice this 1/8th crosswise into four equal parts. Three of these 1/32nd sections represent the areas of the world which are too rocky, too wet, too hot, or where soils are too poor for production, as well as areas developed by man. Developed areas include roads, homes, office buildings, etc.
6. Carefully peel the last 1/32nd section. This small bit of peeling represents the soil on earth which all mankind depends for food source.

Discussion Questions:

1. Ask students about the globe or map and let them explain which is water and which is land.
2. Let them describe what kind of different land formations exist. (mountains, valleys, and deserts – which land formations are suitable for food growth?)
3. Have students explain why having land that is usable is important.
4. Have students talk about how land could possibly be changed to be either usable or not usable for food production.

Related Activities:

1. Invite a farmer into the classroom to talk about his/her methods of protecting soil on their farm.
2. Invite a professional from the local Soil and Water Conservation District office to discuss soil saving procedures.

Other Resources:

1. *ABC's of Illinois Agriculture Coloring Book*, contact your county Farm Bureau[a] to obtain copies.
2. *EARTH*, Bennett-Kightley (Bantam Little Rooster Book).
3. *Our Planet: EARTH*, Feder-Feitel, Scholastic.
4. *Environmental Atlas for Children*, UNICEF.
5. *Children's Atlas of the Environment*, Rand McNally.
6. *Rescue Mission Planet Earth*, Children's edition of Agenda 21 (United Nations).
7. *This Planet is Mine*, Damkoehler-Gehrenbeck (locally), Scholastic.
8. *Environmental Education*, Campbell-Nasman, Schaffer Publications.
9. *Eats Poems*, Arnold Adoff, Mulberry Boo.
10. *It's Our World* (coloring book), Landoll's.
11. *Apple Wise Guys Coloring Book*, International Apple Institute ($1.25), PO Box 1137, 6707 Old Dominion Drive, Suite 320, McLean, Virginia 22101, 1-800-781-4443.

North, South, East, West, Different Crops Grow the Best

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Help students understand that there are different weather conditions throughout the United States.
2. Teach students that certain crops are grown best in certain climates.
3. Help students learn about different crops and where they are grown in the United States.
4. Teach the students what greenhouses are and why they are used.
5. Help the students understand a controlled environment.

Students:

1. Learn that there are different weather conditions throughout the United States.
2. Understand that certain crops grow best under certain weather conditions.
3. Know about the different crops and where they are grown in the United States.
4. Learn about greenhouses and to understand why they are used.
5. Grow seeds in a controlled environment.

Illinois Learning Standards: 11.A.1f; 12.B.1a; 12.B.1b; 12.E.1a; 12.E.1b; 17.A.1a; 17.A.1b; 17.B.1a

Introduction:

Since the 1600s, many changes have occurred in American agriculture. Farmers and scientists have helped these changes to occur. Agricultural scientists study various things in agriculture to help improve the way we grow and process our food and fiber. One very important aspect of agriculture learned by farmers and scientists a long time ago is that certain plants and animals grow best in certain climatic conditions. For instance, by the late 1600s, colonists found that crops such as cocoa beans, sugar, and coffee grew best in tropical regions of the Americas. In the mid 1800s many people moved across the United States to the Great Plains. The large amount of grass in the Great Plains area helped farmers to raise livestock;

however, there was not enough rain to grow a large yielding crop. Farmers soon found that wheat was most suitable for the dry climate conditions of the Great Plains, and farmers began producing large crops of wheat.

Because of climatic conditions varying throughout the United States, corn grows best in what has been termed "The Corn Belt." The Corn Belt consists of 12 states that have the best climate and soil suited for growing corn. These states are Illinois, Iowa, Nebraska, Minnesota, Indiana, Wisconsin, South Dakota, Michigan, Missouri, Kansas, Ohio, and Kentucky. About three-fourths of the U.S.'s corn crop comes from the Corn Belt. The Corn Belt produces such high yields of corn because these states average a daytime temperature of 86°F and a nighttime temperature above 50°F during the growing season.

Today the Great Plains area is also known as the Grasslands. The Grasslands are great for growing livestock such as cattle and hogs because the animals can graze on the land. Wheat is still raised throughout the Grasslands, along with barley, rye, sunflowers, and sugar beets. Through irrigation other crops such as cotton, alfalfa, sorghums, and corn can be grown in the Grasslands.

Cotton grows best in a warm to hot climate where the growing season has many sunny days. This is why states in the south such as Texas, Louisiana, Alabama, Georgia, and South Carolina grow cotton well. These are areas where there are 200 or more days a year in which temperatures do not drop below freezing, which is important for a cotton crop. Many times these states are referred to as the Cotton Belt.

Florida's year-round warm climate is home to many orchards of oranges, grapefruits, tangerines, and limes. Other fruits grown are strawberries and watermelon. Florida's tropical climate also grows sugar very well. Florida is also a major producer of vegetables. Tomatoes, snap beans, cucumbers, sweet corn, celery, cabbage, head lettuce, and carrots are all grown in Florida.

Due to extreme variations in weather conditions, scientists have found that they could study plants best when they could control the temperature, sunlight, and amount of moisture the plant receives. A greenhouse is a building that is specifically designed and made to control the environment in which the flowers, vegetables, and plants grow. It collects the sun's heat to keep the temperature warm. A greenhouse controls light, temperature, moisture, soil, and other growing conditions. By controlling these conditions people can grow flowers, vegetables, plants, and shrubs anywhere in the United States, regardless of the climate in an area. Nowadays many vegetable growers utilize greenhouses to provide cucumbers, tomatoes, and lettuce to consumers outside of their normal growing season.

Materials Needed:

- Large world map or United States map
- Styrofoam egg cartons with lids
- Cotton balls (six per student)
- Eyedroppers
- Six different kinds of seeds
- Scissors

Activity Outline:

1. Discuss with the students the information from the introduction about how crops grow best in certain areas of the United States. Make sure the students understand where different crops are grown and why. Have the students locate the various areas on a world map or a map of the United States.
2. Next discuss with the students what greenhouses are. Make sure they understand that vegetables, flowers, and plants can be grown in greenhouses in different areas of the United States, regardless of climate.
3. Have the students make their own mini-greenhouses. This can be done individually or in groups. To prepare for this activity the 12-cup egg cartons need to be cut in half width-wise. This will give each student a six-cup section of egg carton with a lid. This is their mini-greenhouse.
4. Have students place one cotton ball in each cup of their mini-greenhouses. Then have them take six different types of seeds and place one seed on each cotton ball.
5. Using the eyedroppers, have the students place a couple drops of water on each of their cotton balls until they are saturated.
6. Close the lid of their greenhouses and place them in a warm spot such as a windowsill. Have the children check their greenhouses daily for growth.

Discussion Questions:

1. Is weather the same throughout all of the United States?
2. What grows best in the Grasslands?
3. What type of crop grows best in the South?
4. What is the name of the group of states that grow corn the best?
5. What is a greenhouse?
6. What are some of the controlled environmental conditions in a greenhouse?

Related Activities:

1. Study climates of other countries and what crops they grow.
2. Conduct various growing activities by altering the controlled conditions such as: too much light, not enough light, too much water, not enough water, etc. Chart what happens.

Growing with Technology

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Teach the history of agricultural advancements in farming.
2. Learn about the various pieces of farm equipment and familiarize students with the various pieces.
3. Understand the purpose and importance of each piece of farm equipment and machinery and to extend this knowledge to the students.

Students:

1. Learn about changes in farming methods over the years.
2. Learn about the pieces of equipment farmers use.
3. Understand what each piece of equipment or machine does.
4. Compare the old way of doing various jobs on a farm to the new ways to do the jobs on a farm.

Illinois Learning Standards: 3.A.1; 4.B.1b; 13.B.1c; 13.B.1d; 15.C.1a; 16.A.1c; 16.C.1a(w); 17.C.1a; 17.C.1b

Introduction:

Before the early voyages to discover new land began, certain crops were only known in certain regions. For instance, Europe did not know what potatoes were and had never even heard of them until the Spanish brought potatoes to Europe in the 1500s. When European and Spanish explorers and settlers came to America, the American Indians introduced many new crops to them. The Europeans brought with them their knowledge of various farming methods, tools, seeds, and livestock.

The Agricultural Revolution began in the early 1700s. During this time, many discoveries and inventions were made. This helped to make farming somewhat easier and much more productive. Because of these inventions, one farmer could produce more food and feed more people than before. This allowed people to begin taking new jobs that were away from the farm.

Farmers have to do a lot to prepare the soil to plant a crop, take care of the crop, and get the crop out of the field. Most of the jobs farmers had to do were done by hand with very few

hand tools to help them. To do many of these jobs, farmers used animals to help do the heavy work. Farmers have gone from using very few hand tools before the 1700s to using different types of equipment in the 1700s and 1800s. Still, many inventions required animals such as oxen or horses to pull it through a field or to supply the power for the machine to run. Since then, many advances in farm machinery and farm equipment have been made. Because of these advancements, one farmer can feed more people now than ever before.

One piece of valuable machinery that farmers use today is a tractor. When farmers did not have tractors, they used horses and other animals to pull and work pieces of heavy equipment. The first types of tractors invented were called traction engines. They ran on steam and were hard to maneuver. Over time, newer, improved versions came about and, by the 1920s, a more practical tractor was developed. From then on, tractors have been used for many different things. A tractor is used to plow, plant, cultivate, and pull heavy loads. A tractor can pull heavy machines and equipment because it has a powerful engine. In fact, it is so powerful it equals the same power as 200 horses. Tractors also have huge tires to keep them from getting stuck in muddy places.

A plow is a piece of machinery used to prepare the soil to plant the crops. Plows dig up the soil to allow air and water to get into the soil. This helps improve the soil so when the seeds are planted they will get the appropriate nutrients. The first plow to be invented was a cast iron plow. It had a mould board made of cast iron and handles and a beam made out of wood. The plow was hooked up to horses and a farmer steered it through the field to plow up the soil. Then a steel plow was invented that made plowing the soil much easier because the soil did not stick to the plow as before. Today, plows are more mechanized. They are hooked up to the hitches on the back of a tractor and pulled through the fields. The farmer controls the plow by moving levers inside the tractor's cab, which in turn moves the hitches and the plow.

Before the 1700s, farmers planted crops by spreading the seeds by hand. In the early 1700s, a farmer named Jethro Tull invented a seed drill. The seed drill dug small trenches in the soil and put seeds into them. Today, this piece of equipment is called a planter. Planters put the seeds in the soil and cover the seeds with more soil. Planters have tanks to hold the seeds that will be planted. There are feed meters on the planters to drop the right amount of seeds into the soil. Then the row of wheels on the planters cover the seeds with soil.

Farmers used to harvest crops by hand. They would cut the stalks out of the field, stack them in large piles, and store them in a silo. (A silo is a cylindrical structure in which grain is kept.) Then the farmer had to separate the grain from the stalk by hand. It took many people to do these two tasks. Fortunately Cyrus McCormick invented the reaper, a machine that cut the stalks out of the field. The reaper had a turning wheel that caused a blade to move back and forth and cut the stalks. Soon after that, a thresher was invented. The thresher separated the grain from the stalks. Farmers could then use a reaper to get the stalks out of the field and a thresher to get the grain off of the stalks.

Since the 1930s farmers have used machines called combines to pick the grain from the fields (which is harvesting). A combine is a combination of a reaper and a thresher. A combine is a machine that separates grain from stems as it cuts a crop in the field. Then the combine stores the crop in a big tank that is part of the combine. The leftover stalks are blown out of the combine. When this tank gets full, the auger, which is a long arm on the side of the combine,

moves the crop from the storage tank and dumps it into a truck or wagon.

Dairy cows used to be milked by hand. Every day farmers would milk their cows two to three times a day by hand. Nowadays most farmers use milking machines. Farmers still milk their cows twice a day, but it is a much easier process. The farmers attach suction cups to the teats of a dairy cow. This suction system pumps milk from the cow and into a storage tank. The storage tank keeps the milk fresh and cool. When farmers had to milk by hand, it used to take two people about two and one-half hours to milk 20 cows. Today, the milking machine and one farmer can milk 20 cows in about 15 minutes!

A long time ago, with the help of horses and other farm animals, farmers would cut the hay in the fields and rake it into bundles. Then they would haul it back to the barn to store. Nowadays farmers use hay balers. These hay balers cut the hay or straw, pack it into square or round bales, and then leave the bales in the field.

Materials Needed:

- Copies of "Farm Equipment and Machinery" pictures (one set for teacher use plus copies so each student receives one to color)
- "From Old to New" worksheet

Activity Outline:

1. Talk to the students about farm machinery and equipment. Hold up each picture of "Farm Equipment and Machinery" pictures and discuss what that piece did a long time ago or what it does today (depending upon the picture). Pass around the pictures for the students to get a close-up look of them.
2. Pass out the worksheet "From Old to New." Have the students draw a line between the old method of farming to the newer method of farming. Discuss the answers with the students.
3. Take the copies of the "Farm Equipment and Machinery" pictures and pass out one to each student. (Not all students will have the same picture.) Have the students color in the piece of equipment or machinery. The students should write the name of the piece of equipment/machinery below the picture and/or write a sentence about the piece.

Discussion Questions:

1. How do farmers plant seeds now? How did they used to plant seeds?
2. What two pieces of equipment did farmers use to harvest the crop?
3. What big machine do farmers use now to harvest crops?
4. What machine do farmers use often and attach many types of equipment to?
5. How did farmers used to milk cows? How do they milk cows now?
6. How many times a day do farmers have to milk their cows?

Related Activities:

1. Have the students draw a picture of a farm with pieces of equipment in their picture.
2. Find out what other types of equipment are used by farmers.

Other Resources:

1. The Illinois Farm Bureau® has produced an educational magazine entitled *Ag Mag* 15 "Safety Sleuths" to teach students about farm safety. Contact your county Farm Bureau® to receive free copies for your classroom.
2. *Fun Facts About Farm Equipment* by ERTL®, written by Ray H. Miller, The ERTL Company, Inc.
3. *Mighty Machines – Tractors And Other Farm Machines* by Claire Llewellyn, Dorling Kindersley, Publishing Inc.
4. *A Tractor Goes Farming* by Roy Harrington, published by the American Society of Agricultural Engineers.
5. *Harvest Year* by Cris Peterson, Boyds Mills Press, Inc.
6. *Century Farm* by Cris Peterson, Boyds Mills Press, Inc.

To be used with:
Growing With Technology

Name: _____

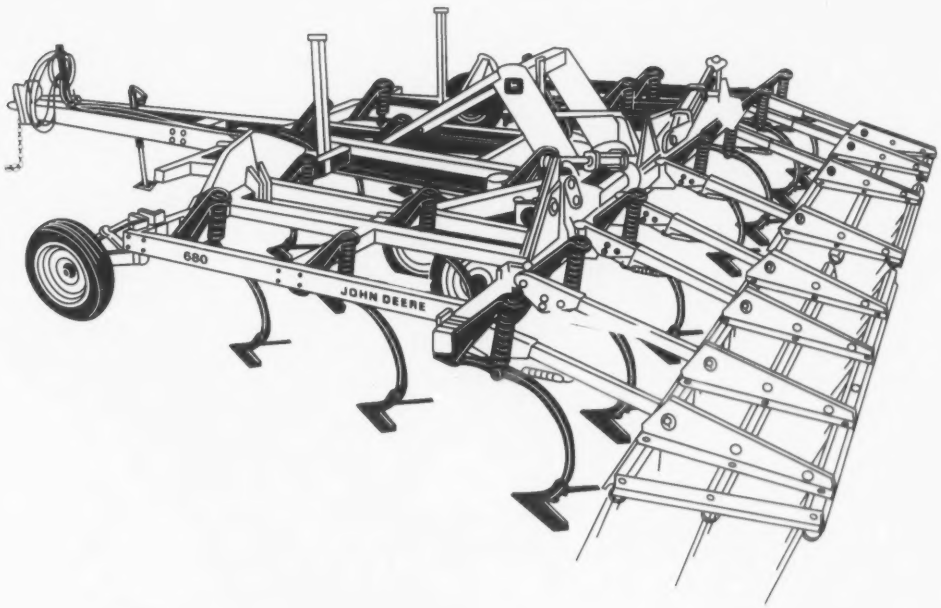
Farm Equipment and Machinery

Tractor

To be used with:
Growing With Technology

Name: _____

Farm Equipment and Machinery

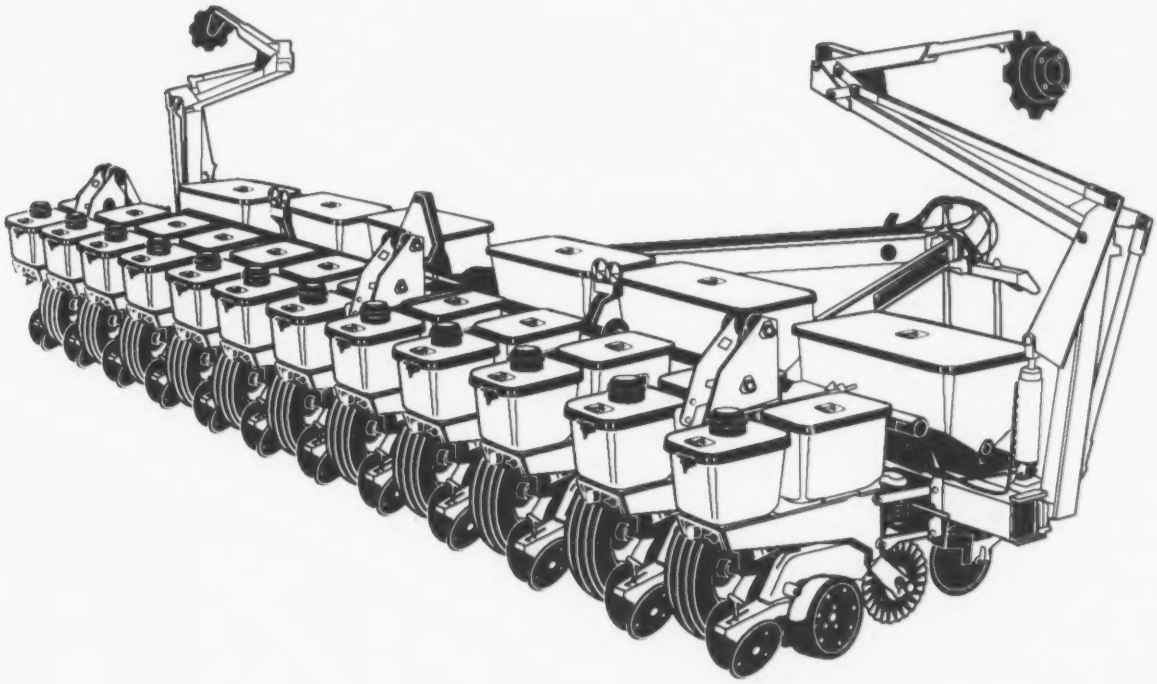


Plow

To be used with:
Growing With Technology

Name: _____

Farm Equipment and Machinery

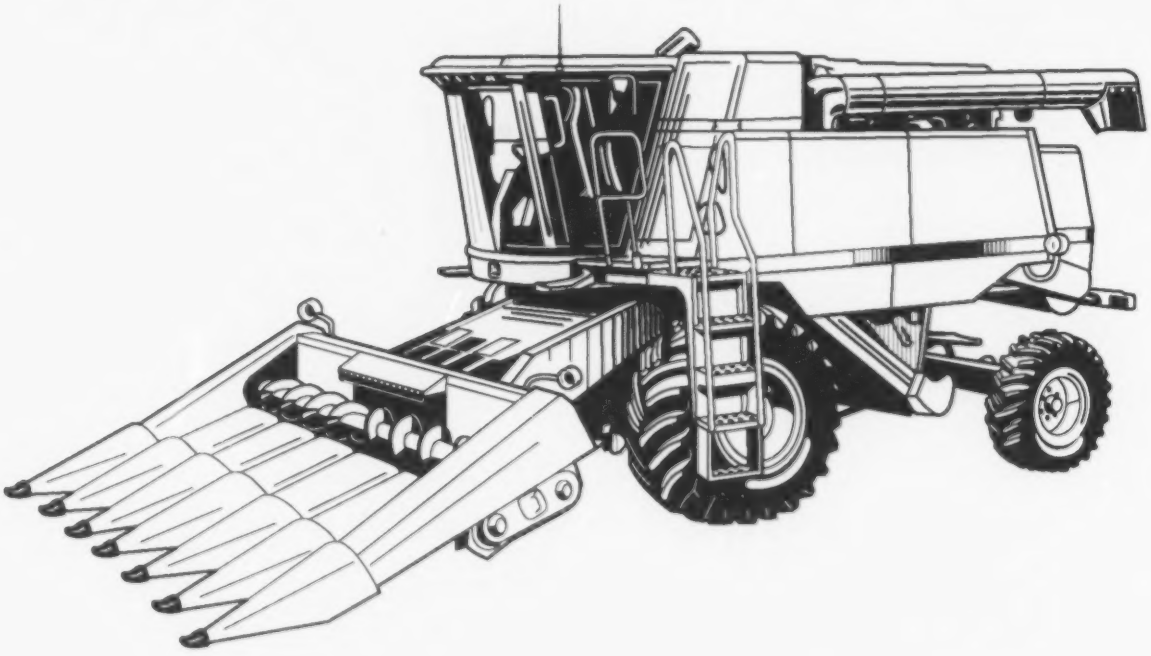


Planter

To be used with:
Growing With Technology

Name: _____

Farm Equipment and Machinery

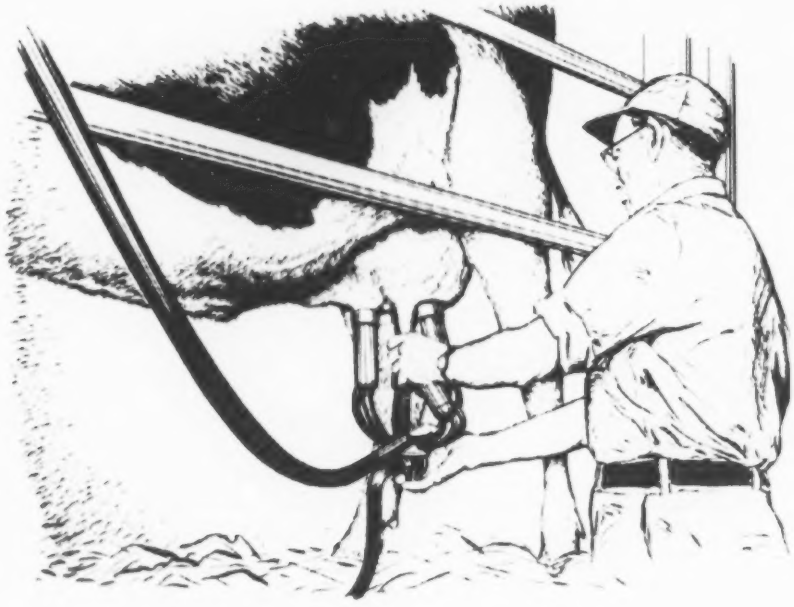


Combine

To be used with:
Growing With Technology

Name: _____

Farm Equipment and Machinery



Milking Machine

To be used with:
Growing With Technology

Name: _____

Farm Equipment and Machinery

Hay Baler

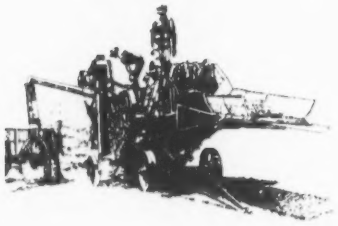
To be used with:
Growing With Technology

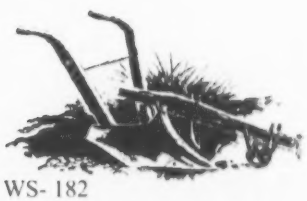
Name: _____

From Old to New

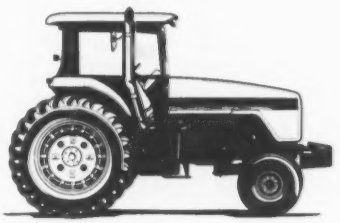
Technology has changed the way people farm. Draw a line to match up the old method to the new method used today.

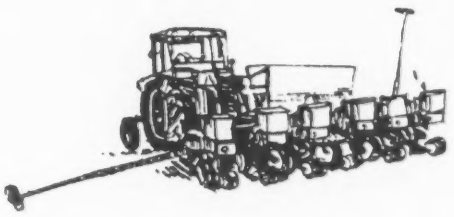
Old Way

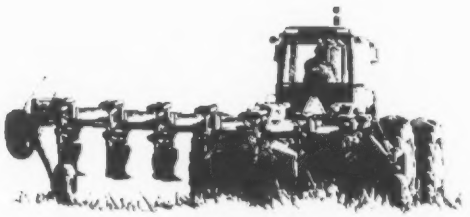


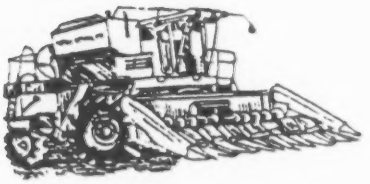


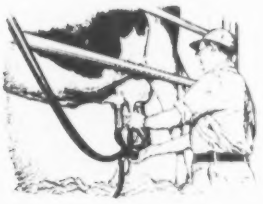
New Way











To be used with:
Growing With Technology

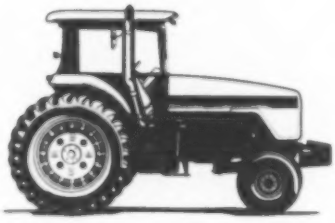
Answer Key

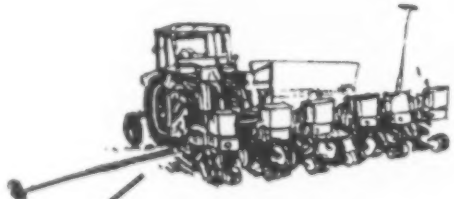
From Old to New

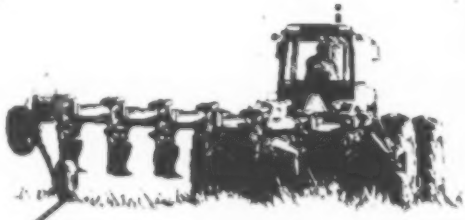
Technology has changed the way people farm. Draw a line to match up the old method to the new method used today.

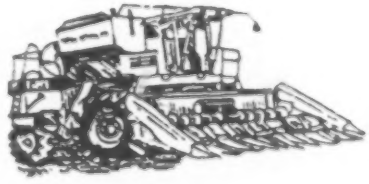
Old Way

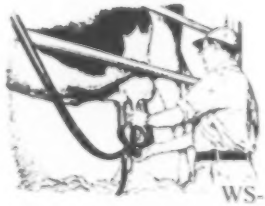
New Way











Barter Day

Grade Level: K-3

Approximate Length of Activity: 45 minutes

Objectives:

Teacher:

Introduce the concept of bartering.

Students:

Experience the concepts of buying and selling using appropriate social skills.

Illinois Learning Standards: 15.A.1a; 15.B.1; 18.C.1

Introduction:

As we know, early people did not have a system of money. Because of this, people had to barter. Bartering is the direct exchange of goods or services without the use of money. Native Americans would use hides and fur to barter with the colonists to get items such as food, cloth, glass beads, guns, gun powder, and metal goods. Through bartering, people learned that almost everyone would accept certain goods in exchange for a certain product or service.

By the mid 1800s, trading posts were developed throughout North America. A trading post is like a marketplace where people bring products to sell or barter for other goods. Today, bartering still exists throughout the world. Some people in developing countries of Africa, Asia, and Latin America barely produce enough to get by. So they must barter to get things they need or want.

Nowadays, trade is very important to American agriculture. The United States trades and exports agricultural products around the world to countries that cannot grow livestock and crops as efficiently as American farmers. The U.S. also trades and exports to countries that cannot grow agricultural products at all because of their climate. We get products from other countries through importing and trading. These countries are able to produce different, less expensive, or better quality products. Trading, along with exporting and importing, allows countries to get the products they need or want and get rid of the excess products that they may not need.

This activity will give students the opportunity to learn about the exchange of goods in the process of bartering. Students will learn about the bartering process used by Native Americans and early colonists. The focus of the lesson will point to the need for the goods being exchanged between the persons, rather than its present known monetary worth. It is to be stressed to children that at the end of today's activity, all materials will be returned to the original owners.

Materials Needed:

- One possession from each child's desk
- Tables or desks to display the items available for trade

Activity Outline:

1. Discuss with the students the meaning of trade and bartering. Compare and contrast the trade conducted by the Native Americans and colonists to the trade nowadays between the United States and other countries.
2. Have students select an item out of their desk to offer for trade to other students. Students may want to choose an item known to be unique and admired by others or just something all students would need. Make sure that all students know that they will get their item back at the end of the activity.
3. Divide the students into two groups. Each group will represent a country. Group A will go to Group B, which remains stationary, to find an individual he/she would like to make a trade with for an item. If a student cannot make a barter or a trade with one student then the student should go to another student to attempt a new barter. (Make sure that the students know they can only trade with someone from the other group.)

Discussion Questions:

1. Were you able to make a trade with another student?
2. Was it easy to make a trade?
3. Which type of trade is similar to what you just did today – is it the trading of the Native Americans and the colonists or the trading that occurs between countries today? Why?
4. What types of things did the Native Americans and colonists trade for?
5. Why is trade conducted today between various countries?
6. How does trade affect crops grown in Illinois? (such as corn or soybeans)

Related Activities:

1. Allow children to dress as Pilgrims and Native Americans and trade items of the time period: trinkets, furs, corn, pumpkins.
2. Allow students to use the same activity format, but form groups to trade for items all could use.

Career Bingo

Grade Level: K-3

Approximate Length of Activity: 45 minutes

Objectives:

Teacher:

1. Provide information on a variety of ag-related careers.
2. Have students work cooperatively on an activity.

Students:

1. Become familiar with careers related to agriculture.
2. Match careers with definition of jobs.

Illinois Learning Standards: 15.A.1b; 15.C.1a

Introduction:

Agriculture is the production of food and fiber through growing crops and raising animals. The agricultural industry is made up of all the people who help feed and clothe other people in the world. So, can you live a day without agriculture? Think about it. It's the food we eat, the clothes we wear, the cars we drive, the homes we live in, and much, much more! This is why the agriculture industry is our nation's largest industry.

There are many areas for employment opportunities in agriculture. These areas are production; social service professionals; education and communication; managers and financial specialists; scientists, engineers and related specialists; and marketing, merchandising, and representatives. All of these jobs are important to the economy of our state, country, and world. There are over 250 career areas available and 22 million people working in agriculture, and this is just in the United States. In Illinois, one out of every five to six people are employed in an agricultural career.

Materials Needed:

- "Agricultural Careers" worksheet for each student
- "Career Bingo Game Card" sheet for each student
- "Career Bingo Pictures" sheet for each student
- Scissors
- Glue
- Markers for Bingo Cards (corn, soybeans, candy corn, etc.)

Activity Outline:

1. Discuss with the students the various careers in agriculture. Use the "Agricultural Careers" worksheet to get ideas.
2. Give each student a copy of the "Career Bingo Game Card" and "Career Bingo Pictures" worksheet.
3. The students should cut out the pictures on the "Career Bingo Pictures" worksheet and glue the pictures into the various boxes on their "Career Bingo" board. Each student should design their own bingo board so no two are alike.
4. Hand out markers for the bingo cards. The markers could be corn kernels, soybeans, candy corn, etc.
5. Use an extra copy of the "Career Bingo Pictures" worksheet to call out careers during the bingo game.

Discussion Questions:

1. What kind of career or job do your parents have? Is it related to agriculture?
2. What type of job would you like to have? Is it related to agriculture?

Related Activities:

1. Interview someone in the agriculture field.
2. Invite a guest speaker to the classroom to tell about their role in agriculture.
3. Take a field trip to an ag-related business.

To be used with:
Career Bingo

Name: _____

Agricultural Careers

Science and Research
Chemist
Animal Nutritionist
Soil Scientist
Plant Breeder
Biotechnologist
Economist
Equipment Tester
Food Packager
Lab Technician
Food Scientist Technologist
By-Product Developer

Ag Communications
Farm Newspaper Editor Writer
Farm Radio Broadcaster Technician
Television Weather Reporter Director
Magazine Writer Publisher
Photographer for Newspaper & Magazine
Advertising Executive Writer
Exhibitor at Agriculture Trade Shows
Market Reporter

Ag Education
High School Ag Teacher
Extension Advisor
College Professor
Government Worker
Health Teacher

Environment and Conservation
Conservationist
Recycling Manager
Environmentalist
Land Use Planner
Irrigation Constultant

Production Agriculture
Beef Producer
Corn Grower
Dairy Farmer
Fruit Grower
Lamb and Wool Producer
Soybean Grower
Swine Producer
Vegetable Grower
Wheat Grower
Poultry Producer

Business & Industry
Feed Mill Operator
Fertilizer Salesperson
Seed Plant Supervisor
Seed Sorter
Pharmaceutical Representative
Manufacturer for Combines, Planters, Tractors
Implement Dealer
Construction Worker for Buildings
Farm Supplier (fences, feeders, grain bins)
Trucker, Barge Operator, Train Engineer
Farm Manager
Loan Officer
Credit Analyst
Grain Broker
Salesman for Feed, Seed, Equipment
Grain Marketer
Country Elevator Manager
Cheese Maker
Bread Maker
Grocer
Butcher
Wholesale Food Salesman
Milk Delivery Driver
Produce Cleaner

Ag Services
Veterinarian
Farm Accountant
Inspector for Feed & Seed
Mechanic
Parts Manager
Welder
Surveyor
Electrician
Ag Pilot
Inspector for Food
Food Broker
Ag Lawyer
Meat Inspector
Restaurant Owner
Waiter/Waitress
Safety Inspector

To be used with:
Career Bingo

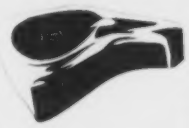
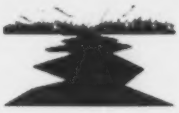
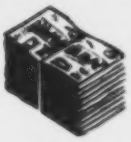
Name: _____

Career Bingo Game Card

		FREE		

To be used with:
Career Bingo

Career Bingo Pictures

Corn Farmer	 Food Inspector	Mechanic	Ag Pilot	Ag Reporter
Ag Teacher	Trucker	Ag Photographer	Veterinarian	Seed Salesman
 Conservation Officer	Sheep Farmer	Researcher	 Newspaper Writer	Elevator Manager
Landscape Architect	Tractor Salesman	Dairy Farmer	Chemist	Vegetable Grower
Hog Farmer	Accountant	Restaurant Manager	Dietician	This space intentionally left blank.

Illinois Lunchables

Grade Level: K-3

Approximate Length of Activity: One hour

Objectives:

Teacher:

1. Develop an awareness of the agricultural products of Illinois.
2. Develop an awareness of soil type and how soil and climate conditions dictate Illinois agricultural products.

Students:

1. Develop an awareness of Illinois agricultural products.
2. Taste and experience Illinois-grown agricultural products.
3. Discuss how climate and soil impact Illinois agricultural products, and produce a sack lunch of food containing Illinois agricultural products.

Illinois Learning Standards: 12.B.1a; 15.C.1a; 15.C.1b; 17.C.1a

Introduction:

Bread is made from wheat grown on farms. Wheat grown in Illinois is used to make cakes, cereals, pretzels, cookies, biscuits, and pancakes, but is not used to make bread. However, wheat grown in other states is used in Illinois bakeries to make bread.

Farmers plant the wheat seed in the ground using a grain drill. The wheat is planted in the fall and it's typically called winter wheat. The wheat plant consists of roots, a stem, long slender leaves, and a head which has kernels (which are seeds). In June or July the wheat is ready to harvest. The farmer combines the wheat in the field and unloads the hopper into trucks or wagons to haul back to the farm or the country elevator. The elevators look like giant silos and may be the tallest structures in small country towns. The country elevator ships the wheat by truck, rail, or barge to a grain terminal. Next the wheat is sold to the various industries which make food, feed, and other products. Some wheat is shipped overseas.

The place where wheat is shipped to make flour is called the mill. The people who process the wheat are called millers. Wheat is put through a cleaning process to remove foreign matter such as weeds, seeds, corn, beans, and stems. Rollers then press over the wheat kernels to break them into pieces. Then they are shaken on screens to sift out the bran (the broken crust of the seed) and germ (the part of wheat used to grow a new plant) not used in

wheat flour. This is repeated many times to make a soft powdery substance we know as flour. If whole wheat bread is being made, the bran and the germ are added back in. Next the miller adds a special ingredient to the flour to whiten it, and B-vitamins and iron are added for nutrients. The flour is shipped in bags to the bakery or to the grocery store.

Bakers like to use wheat flour because it contains a magical protein called gluten. To make dough, they add active yeast, warm water, and other ingredients to the flour. The gluten traps the air bubbles the yeast releases and causes the dough to rise.

Ham, commonly used as a lunch meat, comes from hogs. Bacon, pork sausage, and pork chops also come from hogs. There are close to five million young pigs and mature hogs on Illinois farms. Hogs are usually taken to market when they weigh 220-260 pounds. By this time, they are about five to six months old. Pork in our diet is important because it contains high amounts of protein, B-vitamins, and Thiamin.

Mayonnaise is a product of soybeans, a major Illinois crop. Soybean oil, made by extracting oil from soybeans, is a main ingredient in mayonnaise. The oil makes up 20 percent of the weight of the soybean. Soybeans are also used to make salad dressings, margarine, cookies, cereals, crackers, soup, enamel paints, electrical insulation, pesticides, inks for printing, etc. Other ingredients in mayonnaise include eggs, spices, and vinegar or lemon juice.

The goal of the lesson is for students to create a lunch made from predominantly Illinois agricultural products.

Materials Needed:

- "Look What Grows on Illinois Farms!" handout
- Two long tables to form an assembly line for making the Illinois Lunchables
- Food handling gloves for the class
- Three loaves of whole wheat bread
- One jar of mayonnaise
- Ham slices
- A bunch of seedless grapes
- Two bags of carrot sticks
- Apple juice boxes, one for each student in class
- Four plastic knives
- One box of sandwich bags
- Brown paper lunch sacks, one for each student

Activity Outline:

1. Ask students what agricultural products are grown in Illinois and list them on the chalkboard. (Examples: corn, beans, pork, beef, dairy [milk and cheese], apples, pears, cherries, peaches, strawberries, blueberries, raspberries, grapes, melons, peas, sweet corn, popcorn, tomatoes, peppers, asparagus, onions, cucumbers, potatoes, catfish, chickens, ducks, honey bees, mushrooms, potatoes, watermelon, etc.) See "Look What Grows on Illinois Farms!" handout for more information.
2. Have students provide examples of ag products not grown in Illinois. (Examples: peanuts, cotton, oranges, bananas, grapefruit, pineapple, head lettuce, cranberries, rice, kiwi fruit, and more.)
3. Discuss why farmers can raise some types of crops, but not others. Reasons would include climate (too hot or cold, or too wet or dry) and type of soil.
4. Discuss how farmers plant wheat, harvest wheat, how it gets to the mill, and then to the bakery.
5. Ask the students if the products we eat every day come only from Illinois. Then prepare for Illinois Lunchables.
6. Divide the students in class into three to four working groups for the assembly line to assemble the lunch. The first group serves the second group by preparing their lunches as they pass by the assembly line. Then the passersby become the assemblers when the first group is finished.
7. For the assembly line, the first student of the first group removes two slices of bread, and the second student places one slice of ham on the sandwich. The third student measures out one-half teaspoon of mayonnaise and spreads it on the ham. The fourth student cuts the sandwich and then bags it.
8. In the second functional group, the first student takes the sandwich from the first group, opens a sack, and places the sandwich into the sack. The second student counts out ten grapes and places them into a plastic bag and the plastic bag into the sack. The third student counts out two carrot sticks and places them into a plastic bag, and then into the sack. The fourth person adds a napkin and one box of apple juice drink and hands the sack to the awaiting student.
9. This activity involves standard measurements, i.e., tablespoon, for uniformity and the use of cooperative activity in the larger group and subdivided groups as well.
10. When one half of the class has a prepared lunch, that half becomes the foodhandlers and preparers and the other half is served by the assembly line.

Discussion Questions:

11. Are all of the products you have in your lunch grown on farms?
12. Are all of the products we ate today grown in Illinois? Which ones are and which ones aren't?
13. What are the advantages and disadvantages of growing your own food?
14. How does wheat get from the farm to the bread in the grocery store?

Related Activities:

1. Follow the production of the Illinois Lunchables with a picnic in the schoolyard or local park where local plants and trees can also be discussed.
2. Make a list of the food each student has for dinner that evening, and the next day make a graph of the Illinois agricultural products eaten and those products grown in other areas. Compare the results and discuss.
3. Discuss the recycling of the paper bag and the plastic bag used in preparing the Illinois Lunchables. (See if the juice box, peanut butter jar, jam jar, or plastic knives were made of recyclable materials.)
4. Find out what nutrients, vitamins, and minerals are in the foods you ate in Illinois Lunchables. Was the lunch a balanced meal?

To be used with:
Illinois Lunchables

Name _____

Look What Grows on Illinois Farms

Illinois is a major agricultural producer. In fact, more corn, soybeans, cattle, and hogs are produced here than in just about any other place in the world!

But, did you know Illinois farmers produce dozens of unique grains, livestock, and specialty crops? Many of them even find their way to your family's table or into your homes. If you look closely, you'll also find Illinois agricultural products in items like paints, cosmetics, medicines, fuels, printing inks, chemicals, beverages, and all kinds of food! See how many of these products you can find. You may use them every day. And remember . . . an Illinois farmer probably helped in making them!

Read on to find out more about the contributions of Illinois Agriculture to the quality of life in America.

SOYBEANS

Fact: *There are 10,700,000 acres of soybeans in Illinois — more than anywhere else in the United States!*

Soybeans are found in such products as:

Foods	Non Foods
Cooking oils	Pharmaceuticals
Mayonnaise	Caulking compounds
Animal feeds	Disinfectants
Candy	Electrical insulation
Pet foods	Herbicides
Beer & ale	Printing inks
Bakery goods	Soap
Salad dressings	Crayons
Oriental foods	Glue
Margarine	Paint
Coffee creamer	Plywood
Cereals	Cosmetics
Baby food	Fuel for buses

CORN

Fact: *Illinois produces 1,130,000,000 bushels of corn a year — the second highest in the United States!*

Look for corn in these products:

Foods	Non Foods
Ketchup	Cleaners
Peanut butter	Detergents
Baby foods	Sandpaper
Process cheese products	Charcoal briquettes
Vegetable oil	Photographic films
Margarine	Chewing gum
Fruit juice drinks	Glues & adhesives
Cereals	De-icers for roads
Sweeteners	Ethanol-blended fuels
Beer & ale	Antibiotics
Potato chips	Rubber tires
Shortening	Degradable plastic trash bags
Soft drinks	Cosmetics

CATTLE

Fact: *Illinois dairy cattle produce two-and-a-half million pounds of milk in one year. There are 475,000 beef cattle on Illinois farms.*

Dairy cattle and/or beef cattle also provide us with these products:

Foods	Non Foods		
Milk and milk products	Piano keys	Soaps	
Marshmallows	Floor wax	Plastics	
Pet foods	Textiles	Photographic film	
	Insulin	Candles	
	Vitamins	Pharmaceuticals	
	Chewing gum	Bandages	
	Insulation	Shaving cream	
	Cosmetics	Sutures	
	Boots & shoes	Luggage	
	Perfumes	Shoe polish	

HOGS

Fact*: There are close to five million hogs and pigs on Illinois farms.*

Hogs and pigs provide us with such products as:

Foods	Non Foods		
Chops and roasts	Antifreeze	Upholstery	
Gelatin	Matches	Paint brushes	
	Gelatin	Glue	
	Fabric softeners	Wood putty	
	Glass	Furniture polish	
	Water filters	Insecticide	
	Rubber gloves	Crayons	
	Chalk	Heart valves	
	Cement	Sutures	
	Floor wax	Cosmetics	
	Plastics	Gloves & leather items	

SPECIALTY CROPS

Fact: *Illinois is also known for its specialty crops and other livestock. They range from specialized varieties of grains and oilseeds to animals, birds, nuts, and livestock, and an abundance of fruits and vegetables.*

Some Illinois commodities include:

Grains & Oilseeds	Vegetables	Other Specialty Crops
Wheat	Tomatoes	Sunflowers
Oats	Popcorn	Herbs
Clover	Sweetcorn	Horseradish
Straw	Potatoes	Catfish
Canola		Christmas trees
	Animals, Birds, & Bees	
Fruits & Nuts		
Apples	Ducks	
Blueberries	Honey bees	
Cherries	Buffalo	
Pears	Mink	
Strawberries	Llamas	
Grapes	Lamb & sheep	

Fruit for Sale

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Make students aware of the creativity used in advertising and marketing of agricultural food products.
2. Make students aware of how marketing techniques help to influence people when making consumer choices.

Students:

Become aware of the creativity used in marketing.

Illinois Learning Standards: 26.B.1d; 27.A.1B

Introduction:

Fruits bear seeds and are produced by flowering plants. Almost all fruits grow on woody stemmed plants such as trees, bushes, or woody vines. (Exceptions include bananas and strawberries.) Fruit crops are not grown from seeds like most other crops, so they do not have to be replanted each year. Many fruit plants are productive for 30 to 50 years.

To care for fruit crops farmers fertilize the soil or plants. They also cultivate the soil around the plants to control weeds. Some farmers irrigate their fruit crops so the plants receive enough water. Water sprinklers are used to protect fruit from frost. As the water freezes, it releases heat and keeps the fruit from freezing. Farmers also use heaters to protect the fruit from frost. Fruit trees/plants are usually trained to grow the proper way. When a farmer trains a plant, he/she props the trunk, ties the branches, or prunes it. (cuts off unproductive branches)

After fruit is harvested by hand or machine, it is taken by truck to a packing house. Some orchards/fruit farms have their own packing houses. The fruit is washed, sorted, and packaged. The fruit is then delivered to stores or food processing plants by truck, train, or boat. In storage areas, the temperature is cool and the oxygen is reduced. At the processing plants, fruits are used to make fruit drinks, pie fillings, jellies, and other products. Fresh fruit must be stored under special conditions to stay fresh.

Fruit is a very important part of your daily diet; it is recommended that you eat two to four servings of fruit each day. Many fruits, such as oranges, cantaloupe, and strawberries are a good source of vitamin C. Vitamin C strengthens body cells, promotes healing of wounds

and bones, and helps to resist infections. Athletes who have broken bones or other injuries should take vitamin C to help their bodies heal. Vitamin C may also help your body fight an illness that other students are catching quickly. Loading up on vitamin C will not benefit your body, as the unneeded vitamin C will simply leave your body unused. Most fruits are high in sugar, so they give our bodies quick energy.

After reading *Eating the Alphabet* by Lois Alert, this project is designed to help the student understand how advertising and packaging affects our marketing choices. The teacher will know (1) how to identify fruits; (2) common Illinois grown fruits; (3) fruit is perishable; and (4) have available a collage of pictures of fruit and/or a fruit basket with fruit for students to see.

This project is designed to bring an awareness of the creativity in marketing of products to students and challenge the students to expand their ideas in creative marketing. Each student is asked to draw a picture of his/her favorite fruit and use a design that will make a picture that encourages others to choose that fruit.

After individual drawings are complete, students will select the fruits they were most encouraged to purchase by the picture portrayal. The selection will be done by anonymous voting of the students participating in the activity.

Materials Needed:

- *Eating the Alphabet*, by Lois Alert
- Chalkboard or chart paper
- Magazines or newsprint pictures of fruit and/or real fruit from a supermarket (seed catalogs and grocery ads in the newspaper make excellent sources) as examples
- Drawing paper (9x12) for each student
- Chalkboard ledge or table to display finished drawings

Activity Outline:

1. Read the book *Eating the Alphabet* by Lois Alert to students.
2. Make a list of fruits grown in Illinois on chalkboard or chalk paper.
3. Brainstorm a list of healthy fruits found in the grocery store.
4. Discuss how pictures displayed with the fruits or in the pictures of the fruit will encourage making that fruit choice.
5. Ask each student to choose a fruit he/she would like to sell.
6. On a 9x12 paper, design an advertisement to market your product—one that would help people choose to buy that fruit.
7. Display finished pictures for all students to see.
8. Allow student to place a square of paper in front of their favorite fruit picture that was drawn for a vote. (Students should "vote" one at a time while others hide their eyes.)
9. Discuss what ideas and fruits were used in drawings to help students make their choice.

Discussion Questions:

1. How did the fruit advertising drawing help you make a decision to choose that fruit?
2. Did the picture help you learn about new ways to eat the fruit?
3. Did the picture make you aware of how and where the fruit is grown?
4. Since having this lesson, can you identify the fruit section in a store?
5. After having this lesson, can you make better choices when buying fruit and know when advertising is trying to cause you to make a choice?

Related Activities:

1. Make a grocery list and pick at least two fruits to place on the list to buy.
2. Use the maze included "The Great Grocery Hunt Is On" as a follow-up activity to show the many agricultural products grown on Illinois farms and sold in grocery stores.
3. Create a center in the room and have children vote on the best commercial advertising drawing of the fruit displayed in the center.
4. Create a center using the three highest vote-getters for the class project, and display the actual products with the pictures. Invite another class to vote on the top three selected by the class to determine the best advertising and marketing piece created.

Apples Keep On Growing!

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Give students an understanding of how agriculture can change through time, due to technology and global needs.
2. Teach students about the process of growing apples through literature, music, and discussion.
3. Explain the difference between exaggeration and reality and give examples.

Students:

1. Show an understanding of apple growth by placing the verses of an apple growth song in the correct order.
2. Think of a technological invention that may help apple production after discussing changes that have already occurred.

Illinois Learning Standards: 1.C.1b; 2.A.1b; 11.B.1b; 12.A.1a; 12.B.1b

Introduction:

Thirty-six states in the United States, including Illinois, grow apples in commercial production. There are 20,000 apple growers that use about half-a-million acres to produce apples. Apple producers own or manage their orchards and then sell the fruit to consumers.

Today's methods of apple production are quite different from the practices used by Johnny Appleseed in the early 1800s. Johnny Appleseed (John Chapman) planted many apple trees in the area south of the Great Lakes and between the Ohio and Mississippi Rivers while traveling on his own. Johnny Appleseed managed his apple trees by clearing the land, planting the seeds in rows, and building fences. Today, apple producers prune the trees, apply fertilizers and herbicides, control rodents, mow the orchard, use machinery for harvesting and hauling the fruit, advertise, and sell the crop. They may also process the apples into such things as apple cider, apple pie filling, and applesauce, or sell the apples to processing factories.

Materials Needed:

- Johnny Appleseed book
- Apple production book
- Paper
- Markers, crayons, or pencils
- Chalkboard or dry erase board

Activity Outline:

1. Read a book of your choice that tells Johnny Appleseed's story. Discuss the difference between exaggeration and reality.
2. Read a book of your choice that tells about apple production today. Discuss the process of growing apples (seed, tree, blossom, apple, harvest) and the responsibilities the producer has today.
3. Teach students the Apple Growth Song, sung to the tune of "London Bridges." Before you begin, tell the students what a verse in a song is. Ask the students if each verse has the same tune. Write the verses in mixed-up order on the board, and then ask the students to put them in the right order according to what they know about apple growth.
   Verse 1: This is how we plant the seeds, plant the seeds, plant the seeds, this is how we plant the seeds, just like Johnny.
   Verse 2: This is how the seeds sprout, seeds sprout, seeds sprout, this is how the seeds sprout, in the springtime.
   Verse 3: This is how the tree grows, tree grows, tree grows, this is how the tree grows, in the orchard.
   Verse 4: This is how the blossoms bloom, blossoms bloom, blossoms bloom, this is how the blossoms bloom, in the summer.
   Verse 5: This is how the apples grow, apples grow, apples grow, this is how the apples grow, on the tree.
   Verse 6: This is how the apples are picked, apples are picked, apples are picked, this is how the apples are picked, in the fall.
4. Discuss what a chorus is in a song. The apple growth song has verses, but no chorus. Ask your class to work together to write a chorus.
5. Discuss the differences between producing apples in the 1800s and today.
6. Ask the students to invent and draw a machine to make apple-producing easier.

Discussion Questions:

1. Who was Johnny Appleseed?
2. How is apple production today different than the way Johnny Appleseed produced apples?
3. What is a verse? What is a chorus?
4. What is exaggeration? What is reality?

Related Activities:

1. Pretend to interview Johnny Appleseed and write down the conversation. Students can also write letters to Johnny Appleseed to practice letter format.
2. Have an apple-tasting party to compare the types of apples. Pay attention to texture, size, and color as well as taste.
3. Use apple seeds for math problems. (For example: have students match counted seeds to written numbers.)
4. Create apple poems by using the word "APPLE" going vertical and adding apple descriptions.
5. The Illinois Farm Bureau® Ag in the Classroom program has developed a colorful educational magazine called *Ag Mag* 12 that offers additional interesting and fun information. Please call your county Farm Bureau® to find out how you can receive copies to use in your classroom.

Other Resources:

1. Books:

   Johnny Appleseed by Patricia Dumuth.

   The Seasons of Arnold's Apple Tree by Gail Gibbons.
   How Do Apples Grow? by Betsy Maestro.
   Apple Picking Time by Michele Benoit Slawson.

2. Videos:

   Vrrroooommm 3! "Apple Farming for Kids" Video, Rainbow Communications, 1-800-518-FARM.
   "Apples", DeBeck Educational Video. Available by contacting your county Farm Bureau® or by calling Illinois Farm Bureau® at 309-557-3334.

3. Internet Sites:

   www.dole5aday.com/
   www.bestapples.com/
   http://homecooking.tqn.com/library/weekly/aa100697.htm
   www.wegmans.com/kitchen/ingredients/produce/fruit/apple.html
   http://212.net/apples/apple3.htm
   www.pref.aomori.jp/nourin/ringo/rin-306.html
   www.appleproducts.org/nutritn.html
   www.michiganapples.com/funstuff.html
   www.applesource.com
   www.fortwayne.com/hs/heartland/applseed/part1.htm
   www.appleseed.net/johnnys.htm
   www.applejuice.com
   www.sdcoe.k12.ca.us/score/apple/appletg.html
   www.col-ed.org/cur/misc/misc46.txt

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Ink It Up!

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Show students the value of soybeans through sample products.
2. Help students evaluate their experiment to make conclusions about soybean and petroleum ink.

Students:

1. Learn about the abundance of soybean products.
2. Conduct an experiment that demonstrates the nonvolatility of soybean ink.

Illinois Learning Standards: 11.A.1a; 11.A.1f; 12.E.1c

Introduction:

Soybeans are produced for human food, consumer and industrial products, and livestock feed. One bushel of soybeans, which weighs 60 pounds, produces 11 pounds of soybean oil. About 90 percent of this oil is used in the preparation of food products. The remaining 10 percent is used in consumer and industrial products. Soy inks, plastics, biodiesel fuels, and Environ™ are a few of the industrial uses that have been developed using soybean oil instead of petroleum. Scientists and researchers continue to work to replace petroleum with soybean oil in many other products and to create new uses for soybeans.

Replacing products made with petroleum is very beneficial to us. Petroleum is a non-renewable resource. We only have a certain amount of it and once we use it all, it is gone. Soybeans are a renewable resource because we can always make more soybeans. This makes the soybean very valuable since it can be used to make many things.

Biodiesel Fuel - Biodiesel fuel, which can be used in any diesel engine, is made from soybean oil. This fuel is a clean-burning, biodegradable fuel that can help cities meet federal clean-air standards. Unlike petroleum diesel, biodiesel fuel emits a much lower amount of pollutants, is sulfur-free, and does not produce explosive vapors. Biodiesel also provides similar horsepower, torque, and miles per gallon as petroleum diesel.

Soybean Crayons - Soybean crayons are made with soybean oil instead of petroleum-based paraffin wax. Soybean crayons provide brighter and smoother colors that don't flake. These crayons can be found under the Prang™ Fun-Pro Crayons name at many discount or office supplies stores.

Building Materials - Environ™ is a surface material made with soy flour and recycled paper. A fourth grade student in Minnesota invented Environ™. Then scientists continued research and development on it. They developed a board that works similar to wood, is harder than oak, and lighter than granite. Environ™ can be used in countertops, furniture, plaques, and much more.

Soy Ink - Soybean oil is now being used as a substitute for the petroleum oil in ink. Soy ink is unique in that it will not rub off onto your hands as petroleum-based ink does. This ink is also safer for the environment. Soy ink consumes 41 million pounds of soybean oil annually – equivalent to 3.8 million bushels of soybeans. The use of soy ink makes us less dependent on petroleum oil from foreign countries. Newspapers, commercial printers, and government agencies are using soy ink because it prints more paper per pound and offers better color reproduction. In fact, over 90 percent of all U.S. daily newspapers are printed using soy ink.

Materials Needed:

(For 30 students in groups of two)

- "Soy Ink Activity Diagram"
- 15 jars (4" x 3")
- Samples of regular ink (ex. black felt tip marker)
- Samples of soybean oil ink*
- 15 cotton swabs
- 30 pieces of chromatography paper (or coffee filters cut into strips)
- 1 pint of rubbing alcohol
- 15 pens or pencils
- Tape

Activity Outline:

1. Divide students into groups.
2. Cut a piece of chromatography paper (or coffee filter) into strips. Make sure the strips are one inch longer than your jar is tall and at least two to three inches wide.
3. Place a spot of each ink on the paper one inch away from an end. Place each ink spot at the same end with a little room between each spot. (Use the cotton swabs to apply soy ink if needed.)
4. You will be placing the pencil across the top of the jar, with the piece of paper hanging from the pencil and into the jar. To do this, fold the opposite end of your paper over a pen or pencil and tape it. Make sure the bottom of the paper does not touch the bottom of the jar once the paper is hung in the jar.
5. Carefully pour the rubbing alcohol in the jar without splashing on the paper. Pour until the alcohol just barely reaches the paper so that the paper will draw up the alcohol. Do not fill too much.
6. Let the liquid (alcohol) be drawn up by the paper until the liquid has risen as high as the tape. Take the paper out of the jar.
7. What colors do you notice in each ink?
   Results: The pigments of the soy ink will not separate due to its nonvolatility. The pigments of the petroleum ink will separate into red, blue, orange, and yellow due to its volatility.

Discussion Questions:

1. What are most soybeans used for?
2. Who uses soybean ink?
3. Why is soybean ink more benficial to us and our environment than petroleum-based ink?
4. What types of products contain soy oil?

Related Activities:

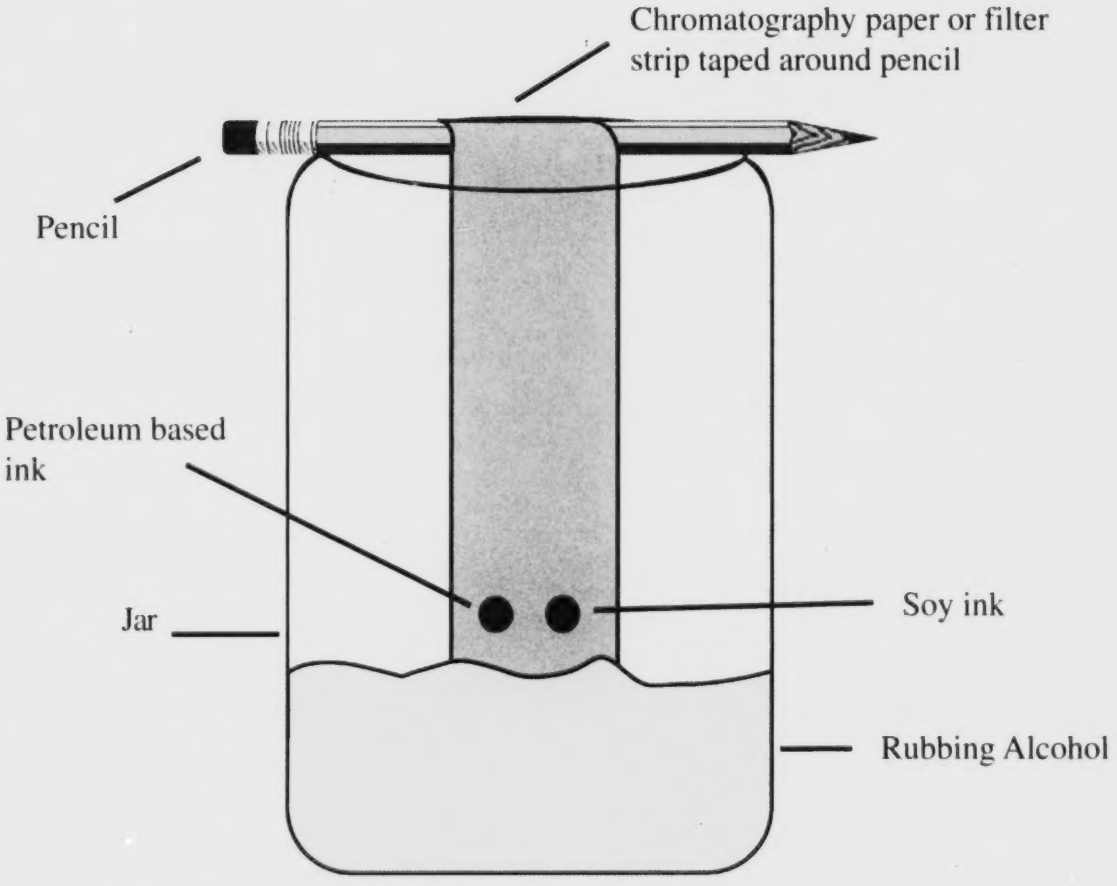
1. Use *Ag Mag* 10, "Imagine a Bean...It's the Coolest Thing," from the Illinois Farm Bureau® to make crayons from soybeans.
2. Grow soybeans in your classroom. Talk about the parts of a soybean plant and how they grow. Chart the plant growth.
3. Make soynuts using the instructions in *Ag Mag* 10, "Imagine a Bean...It's the Coolest Thing."
4. Study George Washington Carver, who discovered that soybeans have valuable protein and invented many uses for them.
5. Use soybean plants to study root growth, transpiration, evaporation, and light.

Other Resources:

1. *Ag Mag* 10, "Imagine a Bean . . .It's the Coolest Thing," an educational magazine for classrooms. Contact your county Farm Bureau® for information about using free *Ag Mags* in your classroom.
2. "Soybeans: The Miracle Crop" kit for grades 4-6, Illinois Soybean Association, Illinois Soybean Checkoff Board, 1605 Commerce Parkway, Bloomington, IL 61704, (309) 663-SOYA.
3. The Indiana Soybean Kit, available for loan from many county Farm Bureaus®.
4. "The Soybean Solution," Nebraska Soybean Association, 301 Centennial Mall So., 4th Floor, Box 95144, Lincoln, NE 68509.
5. "Captain Soybean and his Protein Potent Pals Wonder Book," and "The Miracle Crop . . . SOYBEANS," (brochure) from the Illinois Soybean Association, Illinois Soybean Checkoff Board, 1605 Commerce Parkway, Bloomington, IL 61704, (309) 663-SOYA.
6. *Why the Brown Bean was Blue*, by Susan M. Pankey, Nebraska Ag in the Classroom, 5225 S. 16th St., Lincoln, NE 68512, (402) 421-4400.
7. "Where's Bennie?" Coloring Book, Indiana Soybean Development Council, 423 West South Street, Lebanon, Indiana, 46052, (317) 482-4376.
8. Ag in the Classroom Video Lesson Plans on Soybeans featuring "Sandy Soybean," North Carolina Farm Bureau & North Carolina Soybean Producers Association, P. O. Box 27755, Raleigh, NC 27611, (919) 783-4326 or (919) 782-1705.
9. "Soy McCoy Coloring Book," Ohio Soybean Council, P. O. Box 479, Columbus, Ohio 43216.
10. "The Magic Bean: A Look at the Versatile Soybean" and "Look Where Soybeans Go" brochures from Archer Daniels Midland Company, Box 1470, Decatur, Illinois 62525, (217) 424-5200. http: www.admworld.com
11. "1995 Soy Stats" A reference guide, American Soybean Association, P. O. Box 419200, St. Louis, MO 63141-9200, (314) 576-1770.
12. Internet Sites:
    Illinois Soybean Association, Illinois Soybean Checkoff Board: www.ilsoy.org
    American Soybean Association: www.oilseeds.org asa
    Soybean Statistics: www.ag.uiuc.edu ~stratsoy 96soystats pg2.html

To be used with:
Ink It Up!

Soy Ink Activity Diagram



Beefo Bingo

Grade Level: K-3

Approximate Length of Activity: 45 minutes

Objectives:

Teacher:

1. Teach students about beef meat and by-products.
2. Help students understand the concepts "vertical," "horizontal," and "diagonal" while playing Bingo.

Students:

1. Learn beef by-products while playing Bingo.
2. Show an understanding of "vertical," "horizontal," and "diagonal" while playing Bingo.
3. Learn about the nutritional value of beef during a class discussion.

Illinois Learning Standards: 12.A.1a; 22.A.1b; 23.A.1; 23.B.1

Introduction:

Almost the entire beef animal can be used to benefit man in some way. From a typical 1000 pound steer, 400 pounds is used for beef that we eat and the remaining 600 pounds are used as by-products.

These are some common types of beef: pot roast, sirloin steak, ground beef, rib eye steak, and tenderloin steak. Beef is a good source of protein (which builds, maintains, and repairs body tissues), iron (which helps the red blood cells carry oxygen to body cells and tissues), zinc (which is a mineral used for growth and maintaining the immune system), and B-vitamins (which promote healthy skin, keep the nervous system healthy, and are important for digestion and metabolism).

Beef by-products are anything made from a beef animal other than beef. You probably use more beef by-products than you think! Here are some examples:

Bone, Horn, Hooves, & Gelatin

Combs, gelatin candy (Gummy Bears), marshmallows, mayonnaise, gelatin, photographic film, steel ball bearings, fine bone china, pet food, and vitamin capsules/gel coatings.

Hide & Hair

Insulation, paint brushes, glue for bookmaking and band-aids, clothes, shoes, luggage, saddles, furniture, automobiles, volleyballs, basketballs, and baseball gloves.

Fats & Fatty Acids

Shampoo, soaps, shaving creams, cosmetics, deodorants, candles, crayons, floor wax, detergents, hydraulic brake fluid, plastics, insecticides, paints, perfumes, and synthetic rubber.

Materials Needed:

- "Beefo Bingo" game boards
- "By-products Board Pieces" sheet
- Container (large cardboard or storage box, etc.)

Activity Outline:

1. Discuss the introduction information with your students.
2. Make enough copies of the game board and the game board pieces so each student has one. Give each student one cow game board and one by-products sheet.
3. Have the students cut out the by-products pieces. They should select 24 of them and glue them to the game board. The center square is a free spot so nothing should be glued there. You may want to laminate boards after they are put together. (Or you could put the boards together before-hand instead of having the students do it.)
4. The teacher should laminate one by-products sheet to keep track of what by-products have been called. Another by-products sheet can be cut up and put into a container to "call" the products.
5. Give the students "markers" for their game boards. Markers could be miniature marshmallows, peanuts, grain kernels, buttons, etc.
6. The teacher or caller reaches into the container and draws out a by-product piece. They call this out to the group.
7. The students look at their board to see if they have that by-product. If they do, they cover it up with a marker.
8. The first student to have five squares in a row covered, either vertically, horizontally, or diagonally wins. (Make sure the students understand the meaning of vertically, horizontally, and diagonally before beginning.)

Discussion Questions:

1. Name five beef by-products.
2. What parts of a beef animal are used for by-products?
3. Name some common types of beef that is eaten.

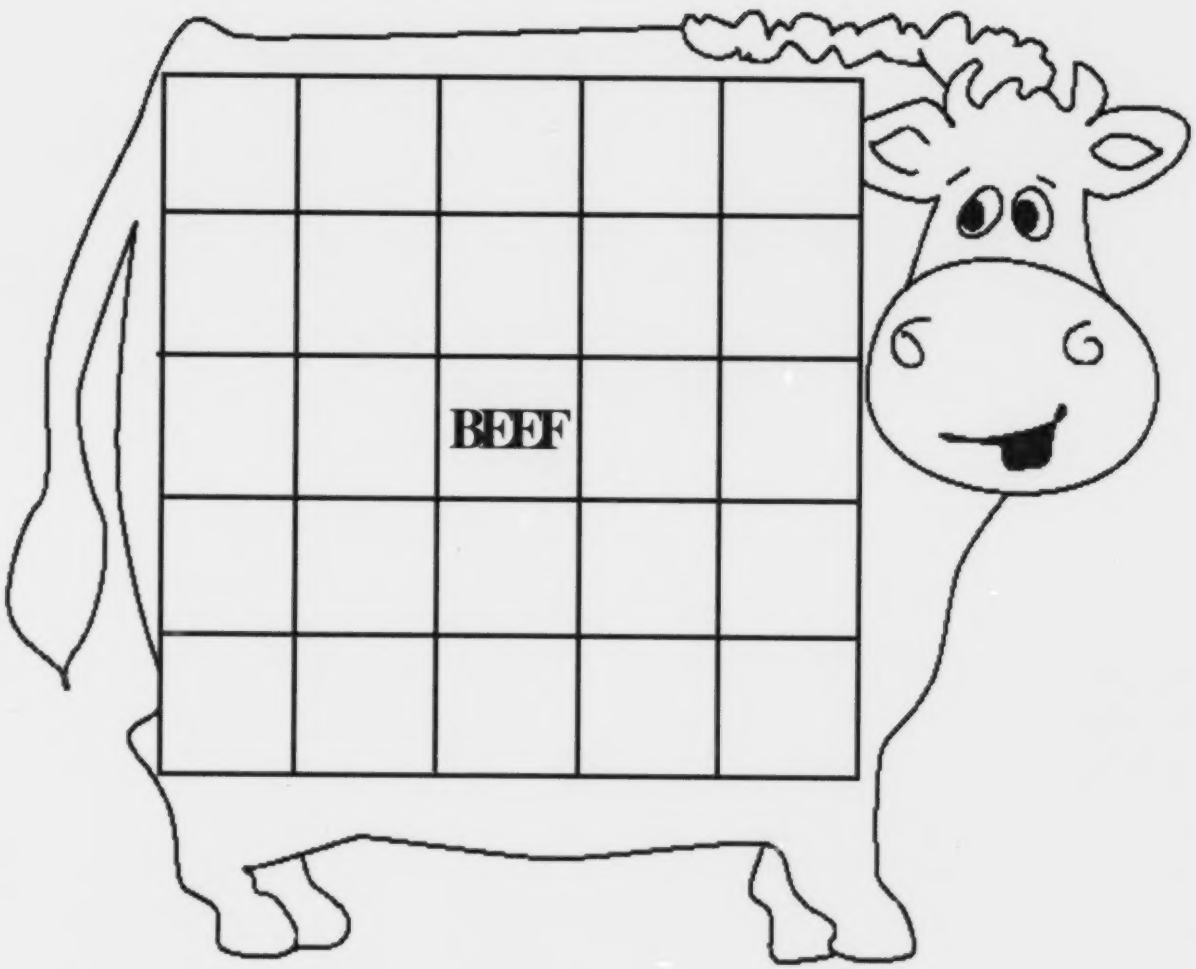
Related Activities:

1. *Read Your Calf: A Kid's Guide to Raising and Showing Beef and Dairy Calves* by Heather Smith Thomas.
2. Compare the nutritional value of beef to other types of food.

To be used with:
Beefo Bingo

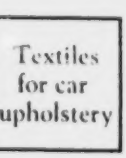
Game Board

Beefo Bingo



To be used with:
Beefo Bingo

By-products Board Pieces

Insecticides	Paints	Brake Fluid	Machine Oil	Tires	Car Polish
Feed	Steel ball bearings	Cake mix	Marshmallows	Pasta	Mayonaise
Floor wax	Soap	Gelatin	Leather chairs	Candy	Candles
Crayons	Glue	Leather shoes	Baseballs	Footballs	Basketballs
Cosmetics	Deodorant	Shoe cream	Shaving cream	Iron pills	Insulin
Emery board	Bandages	Luggage	Cellophane	Ceramics	Detergent
 Textiles for car upholstery	Car Wax	Piano keys	Paint brushes	Perfume	Vitamine B12
Bone china	Pet food	Chewing gum	Photographic film	Oleo margarine	Linoleum

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Making Soil in the Classroom

Grade Level: K-3

Approximate Length Of Activity: One hour

Objectives:

Teacher:

1. Provide a visual learning experience to see how soil is formed.
2. Teach the importance of soil conservation.

Students:

1. Learn what soil is made of and the time required for soil to form.
2. Understand the importance of caring for and saving our soil.

Illinois Learning Standards: 11.A.1a; 12.E.1a

Introduction:

Soil is one of our most important natural resources. It is made up of decaying plants and animals. Molds and microscopic animals called bacteria live in our soil and "recycle" dead plants and animals. The animal and plant wastes break down into nutrients and minerals that living plants can use. Earthworms in the soil make tunnels, which allows air and water to get to the roots of plants and keep the soil from becoming too hard. In nature this takes a while to happen. New soil isn't formed overnight! It is important to take care of the soil. Grass roots help hold the soil in place. Most farmers do not plow in the fall because much of the topsoil would blow away during the winter and early spring.

Soil contains nutrients that allow crops (plants) to grow, and it also holds moisture for crops. There are four different types of soil: sand, silt, loam, and clay. Sandy soils contain the largest particles found in the soil. When sand is wet, it will not stick together, allowing water to run easily through it. Therefore, sandy soils don't hold enough water to grow a good, healthy plant. Silt soil contains particles between the sizes of sand and clay. Loam soil is a mixture of sand, silt, and clay. It retains moisture and air and is the best type of soil for good plant growth. Clay contains the smallest particles found in soil. Wet clay sticks together and dry clay cracks. Water will not run through clay easily and there is little air in clay soil.

A good visual for young students is this comparison: Sand particles can be related to the size of a basketball, silt particles can relate to the size of an eraser head on a pencil, and clay particles are similar to the size of a pin head.

Materials Needed:

- Leaves
- Crushed rocks
- Pebbles
- Pinecones
- Grass
- Sticks
- Large bowl
- Two soils samples, from different locations
- Potting soil
- Gallon jar
- Water

Activity Outline:

1. Discuss the ingredients of soil and how soil forms.
2. Collect materials such as leaves, crushed rocks, pebbles, pinecones, grass, sticks, etc.
3. Mix the materials in a large bowl, with one of the soil samples, to create your own soil. Discuss how these items are found in nature and often become part of the soil. Tell the students that soil needs sunlight, water, nutrients, earthworms, bacteria, and time to form.
4. Show the students what soil looks like after it has had time to form. Explain to them that the soil has three different mineral contents: clay, silt, and sand. Discuss the characteristics of each.
5. Add the second soil sample to a jar until the jar is half full.
6. Fill the jar three-fourths full of water.
7. Shake the jar and set it on a table.
8. After a few minutes, the sand will settle on the bottom of the jar because it is the heaviest of all the particles. After half-an-hour, silt will settle as the next layer in the jar. After letting the jar sit overnight, the clay particles will settle as the last (top) layer. Since the clay particles are the lightest they settle last.
9. Try a soil sample from a different location and then potting soil. Were the amounts of clay, silt, and sand different? Did the layers take longer to settle at the bottom of the jar?

Discussion Questions:

1. Name five "ingredients" that make up soil.
2. How can we help take care of this natural resource?
3. What are the three basic types of soil?
4. What was the largest amount of soil in the jar? Sand, silt, or clay?
5. What type of soil was the least amount in the jar?
6. Why did the sand settle first?
7. Why did the clay settle last?

Related Activities:

1. Make an edible "dirt cake" that can be enjoyed as a snack. A recipe can be found in Illinois Farm Bureau®'s *Ag Mag* 4.
2. Invite a Resource Conservationist to talk to the class.
3. Make mini-compost bins from old milk jugs. See *Ag Mag* 2 from Illinois Farm Bureau® Ag In The Classroom. Contact your county Farm Bureau® to get copies for your classroom.

Rainforest Galore

Grade Level: K-3

Approximate Length of Activity: Two hours

Objectives:

Teacher:

1. Help the students understand that trees help our environment and are important to our lives.
2. Guide students in arranging their knowledge of rainforests into an attractive bulletin board.
3. Help students understand the locations of rainforests.

Students:

1. Explain why trees help our environment.
2. Construct a bulletin board to represent the layers of a rainforest.
3. Identify the countries where rainforests are located.

Illinois Learning Standards: 12.B.1a; 17.A.1a; 17.A.1b; 26.A.1e; 26.B.1d

Introduction:

Forests are a large tract of land covered with trees and underbrush. Rainforests were originally named for forests that grow in constantly wet conditions. Now they are considered forests that are located in areas which receive more than 80 inches of rain per year. Rainforests grow in over 50 countries. Although we often think of the tropical rainforests along the equator, there are other types of rainforests. Flooded mangrove forests are along the salty coastlines of the Southeast Asian Islands, high altitude cloud forests are in South America, and temperate rainforests are found in the U.S. Pacific Northwest.

Rainforests have four levels: the emergent level, the canopy level, the understory level, and the herb layer.

The *emergent level* includes trees between 115 and 250 feet above the ground. The trees in the emergent level have small leaves, umbrella-shaped crowns, and tall slender trunks. Emergent level trees have the greatest amount of sunlight, but also have high temperatures, low humidity, and strong winds.

The *canopy level* is under the emergent level. Canopy trees are very tight and densely covered with other plants and vines. In this level, 90 percent of the organisms in the rainforest

are found.

The *understory level* is beneath the canopy level. These trees and shrubs are shorter than 15 feet and they only receive two to 15 percent of the sunlight that falls on the canopy. The understory level is dark, due to the dense canopy level. Many young trees and leafy plants grow here because they can tolerate low light.

The *herb layer* is on the forest floor. On the forest floor, the air is still, the temperature is constant, and the humidity is almost always above 70 percent. There is not much vegetation on the forest floor because very little light can reach it. The thin layer of vegetation includes fallen leaves, seeds, fruits, and branches.

Trees, such as those in rainforests, help our environment in many ways. Trees act as windbreaks and keep the wind from blowing the topsoil away. The roots of trees help prevent soil from being washed away during heavy rains because the roots and root hairs hold the soil in place. Trees also help to make soil. The leaves add organic matter to the soil and roots break soil and rocks down into smaller pieces. Forests provide a sheltered environment for wildlife, and forests in mountain regions prevent snow from sliding down and causing avalanches.

Trees also add water to the air. Not all of the water trees absorb is used to make food for the tree. Most of the water is lost through transpiration, which puts water back into the air. This added moisture to the air helps to make rain.

Materials Needed:

- Construction paper (various shades of green, brown, and white)
- Crayons or markers
- Stapler and/or glue
- Encyclopedias (optional)

Activity Outline:

1. Discuss how trees help our environment and then discuss what rainforests are.
2. Teach the students about the different layers in a rainforest. Additional information about rainforests can be found in the encyclopedia under "tropical rainforest."
3. Have the students create a bulletin board rainforest. Divide the class into four groups. Assign one group the "emergent level," another group the "canopy level," another the "understory level," and the last group the "herb layer."
4. The emergent level group should make tall trees like the ones found in the emergent level. The canopy level group should make trees close together that have vines and other plants around them. The understory level group should make short trees and shrubs. The herb layer should draw the forest floor that has fallen leaves, seeds, fruits, and branches lying on it. Make sure the group leaves some room for the trunks of the other trees and shrubs on the forest floor.
5. The students may also want to research what types of animals are found in rainforests and add them to their rainforest display.

Discussion Questions:

1. Why are trees beneficial to our environment?
2. Where are rainforests found?
3. Name the layers of rainforests.
4. Name the different types of rainforests.

Related Activities:

1. Many products that we use everyday are made from trees: vinegar, coffee filters, pancake mix, maple syrup, parmesan cheese, pet food, hot chocolate mix, apple cider, jams, jellies, antacids, aspirin, brushes, candlesticks, carpeting, chairs, clocks, clothing, combs, fireplaces, furniture, hairspray, hooks, linoleum floor, liquid soap, makeup, nail polish, paint, paint thinner, paper plates and cups, rayon curtains, shampoo and conditioner, tables, tea bags, toilet paper, toothpaste, towel racks, wall paper, wax polish, car bumpers, eyeglass frames, tires, football helmets, guitars, toys, photographs, pianos, and plaques. Discuss what life would be like without trees.
2. "Oxygen Givers:"
   a. Materials needed: Clear plastic cups, non-sealable plastic bags, leafy twigs, scotch tape.
   b. Have each student (or group) fill two cups half full with water. Give each group two leafy twigs.
   c. Remove the leaves from *one twig*.
   d. Place a plastic bag over each twig and tape tightly.
   e. Place each twig in a cup of water.
   f. Place the cups in the sunlight for a couple of days.
   g. After a couple of days, discuss with the class what has happened. How do leaves give us oxygen and water?

Mighty Machines

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Introduce students to various pieces of farm equipment and machinery.
2. Show students what the equipment/machinery looks like.
3. Help students work on memory skills.

Students:

1. Learn about various pieces of farm equipment and machinery.
2. Identify pieces of equipment/machinery.
3. Improve memory skills by playing a game focusing on farm equipment.

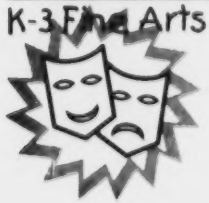
Illinois Learning Standards: 13.B.1c; 13.B.1d; 15.C.1a; 16.A.1c; 16.C.1a(w); 17.C.1a; 17.C.1b

Introduction:

Farmers use many types of machinery and equipment to help them with their job. Some of the equipment and machinery that farmers use are tractors, combines, planters, mowers, tractor loaders, hay balers, and spreaders. These are not all of the pieces of equipment/machinery that some farmers need. The type of farming that a farmer does will determine what type of equipment and machinery he or she needs. The equipment and machinery used today help grain and livestock farmers produce better quality products in larger amounts. This means that one farmer can feed more people now than ever before. In 1940 one farmer was able to feed almost 19 people. In 1995 one farmer was able to feed 129 people.

Here are some of the pieces of equipment or machinery that farmers might need:

Combine - Since the 1930's farmers have used machines called combines to pick the grain from the fields. A combine is a machine that separates grain from stems as it cuts a crop in the field. As combines cut the grain out of the field, it also removes the corn kernels from the cob and the soybeans from the soybean pods. Then the combine stores the crop in a big tank that is part of the combine. When this tank gets full, the auger, which is a long arm on the side of the combine, moves the crop from the storage tank and dumps it into a truck or wagon.



Tractor – A tractor does many things on a farm. A tractor is used to plow, plant, cultivate, and pull heavy loads, pull wagons filled with grain, and much more. Tractors can pull these heavy machines and equipment because they have powerful engines. In fact, tractor engines are so powerful that they equal the same power as 200 horses would have. Tractors also have huge tires to keep them from getting stuck in muddy places.

Tractor Loader – A loader is a piece of equipment that gets attached to the front of a tractor. A loader is like a big, wide shovel. Farmers use tractor loaders to haul things and move things. A farmer can use it to move hay, grain, gravel, or many other types of things around the farm.

Mower – A mower is a piece of equipment that cuts grass. Some mowers used on the farm are much bigger than the push mower people use to cut their lawns. Most farmers have big, wide mowers that attach to the back of the tractor.

Planter – A planter is a piece of equipment used to plant seeds in the fields. Planters will put the seeds in the soil and cover the seeds with more soil. Planters have tanks to hold the seeds that will be planted. There are feed meters on the planters to drop the right amount of seeds into the soil. There is a row of wheels on the planters to then cover the seeds with soil once they are dropped into the field. There are different types of planters that plant different crops. Farmers use corn planters to plant corn. To plant soybeans most farmers use a planter that is also known as a drill. A drill plants the rows of soybeans closer together than a planter would plant corn rows. Since corn stalks grow much bigger than soybean stalks, corn needs to be planted in wider rows. Soybeans can be planted in narrower rows, which also helps a farmer plant more rows of soybeans in one field.

Hay balers – A baler is a machine that packs hay together into round or square shapes. Hay balers also put twine around the bale and drop it back onto the ground in the field.

Spreader – A spreader is a piece of equipment that spreads fertilizer onto the crops. Fertilizer contains nutrients that help crops grow.

Milking Machines – Farmers use milking machines to milk their cows. Farmers milk their cows twice a day, but it is a much easier process than it used to be. The farmers attach suction cups to the teats of a dairy cow. This suction system pumps milk from the cow and into a storage tank. The storage tank keeps the milk fresh and cool. When farmers had to milk by hand, it used to take two people about two-and-one-half hours to milk 20 cows. Today, the milking machine and one farmer can milk 20 cows in about 15 minutes!

Grain Truck and Wagons – Farmers use grain trucks and wagons to haul grain from their farm to the grain elevator. When farmers harvest their crop with a combine, the combine fills up with grain. When the combine is full, the farmer pulls his/her grain trucks and wagons alongside the combine. The combine extends its auger (like an arm) and dumps the grain into the back of the truck and into the wagons. Farmers have to do this many times during the harvest season. When the truck and wagons are full of grain the farmer hauls them to a storage bin on his/her farm or to a grain elevator that stores the grain for the farmer.

Materials Needed:

- "Farm Equipment Match-Up" worksheet
- "Farm Equipment Pictures"
- "Farm Equipment Match-Up Game" pieces
- Dice

Activity Outline:

1. Begin with a class discussion on farm machinery. Discuss the various pieces of equipment or machinery from the introduction. Hold up each picture of the farm equipment/machinery as you talk about the piece. Pass around the pictures so the students become familiar with them.
2. Make copies of the "Farm Equipment Match-Up Game." Cut the cards apart on the lines. The students can play with the copies or you can laminate them to use them again and again. Make enough copies so the class can split into pairs and each pair of students will have a set to play with.
3. Split the class into pairs or let them pick a partner. Give each pair of students a set of "Farm Equipment Match-Up Game" cards.
4. Explain to the students that this game is similar to the game Memory®. The students should turn the cards over and mix them up well. Place the cards face down on the floor or desk and spread them out. Have each pair of students roll one die. The student who rolls the highest number goes first.
5. Have the first student flip over a card. Then they should flip over another card. If these two cards match, the student can keep them and go again. If they don't match, the students should flip the cards back so they are face down again; then it is the other student's turn. Have the students continue trying to match pairs until all cards are matched.
6. When all matches have been made, have each student turn their matches right side up in front of them. The teacher should go around and have each student tell you what each piece of machinery or equipment is that they matched up. When the student tells you the correct name, they can keep the match, if they tell you the incorrect name then that match is discarded. After the students have identified what their own matching cards are, the student with the most matches left wins. If you have time, let the students play again.
7. For older grades, give each student a copy of the worksheet "Farm Equipment Match-Up." Have him/her use the words at the top of the worksheet to fill in the blanks under the pieces of machinery.

Discussion Questions:

1. What does a farmer use to plant corn or soybeans?
2. What does a farmer do when hay is ready to be cut in the field?
3. What has four wheels and an engine and is used to run many types of farm equipment?
4. What piece of equipment cuts grass?
5. When a farmer needs to move a load of grain, what does he or she use?
6. What types of jobs does a combine do?
7. What does a spreader do?

Related Activities:

1. The Illinois Farm Bureau® has produced an educational magazine entitled *Ag Mag* 15 "Safety Sleuths" to teach students about farm safety. Contact your county Farm Bureau® to receive free copies for your classroom.
2. Research an inventor of farm equipment.
3. Invite an implement dealer to your classroom or visit one.

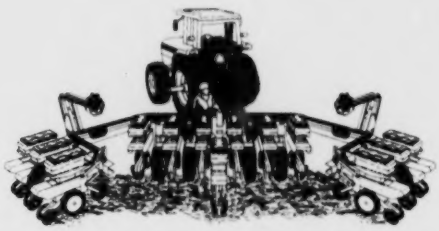
To be used with:
Mighty Machines

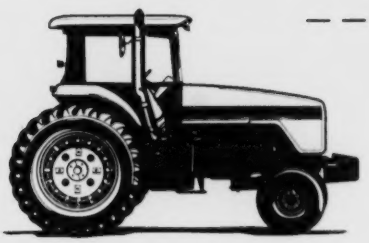
Name _____

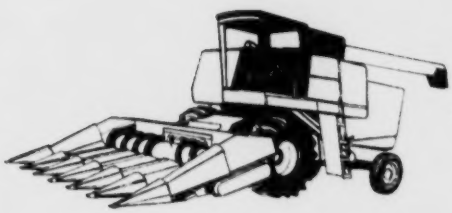
Farm Equipment Match-Up

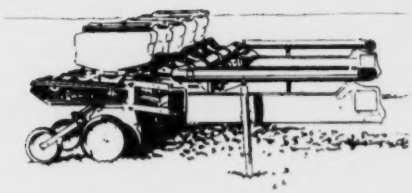
Match the following words to the pieces of equipment. Write the name of the equipment under the picture.

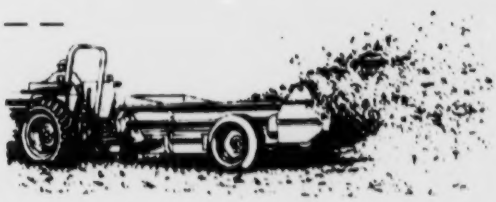
Combine
Spreader
Baler
Soybean Drill
Tractor Mower
Tractor Loader
Corn Planter
Tractor











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To be used with:
Mighty Machines

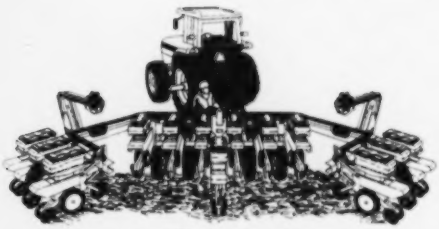
Answer Key

Farm Equipment Match-Up

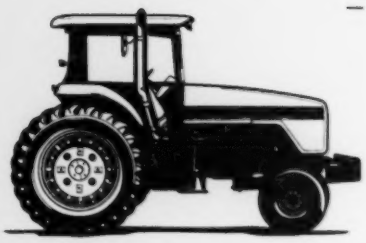
Match the following words to the pieces of equipment. Write the name of the equipment under the picture.

Combine
Spreader
Baler
Soybean Drill
Tractor Mower
Tractor Loader
Corn Planter
Tractor

Tractor Loader

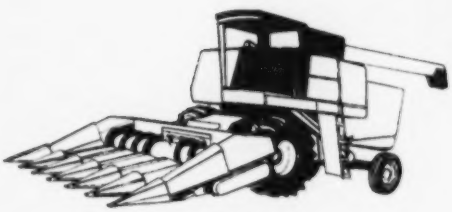


Corn Planter



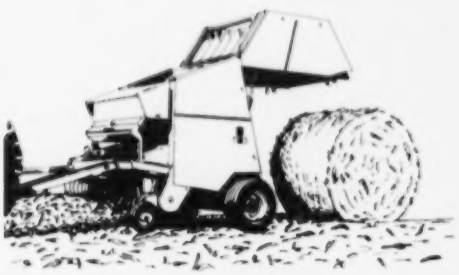
Tractor

Tractor Mower

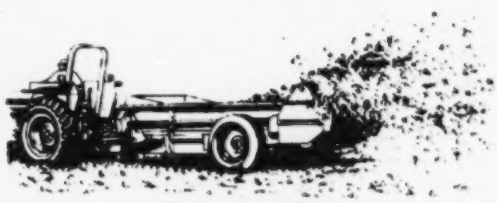


Combine

Soybean Drill



Baler

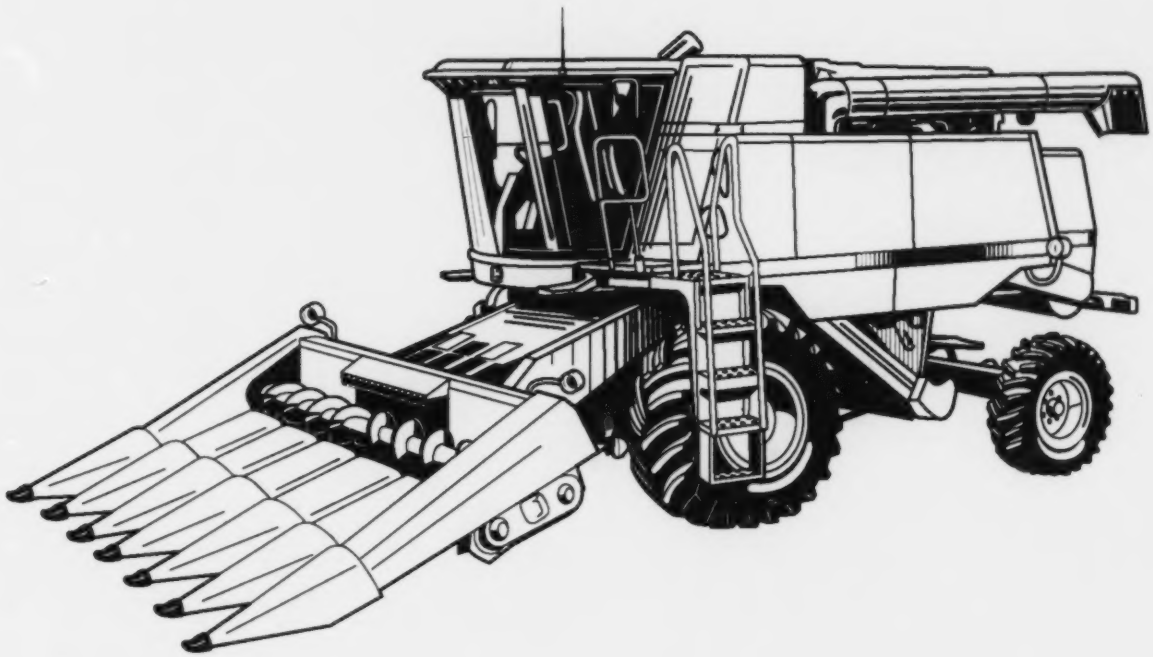


Spreader

To be used with:
Mighty Machines

Name: _____

Farm Equipment Pictures



Combine

To be used with:
Mighty Machines

Name: _____

Farm Equipment Pictures

Tractor

To be used with:
Mighty Machines

Name: _____

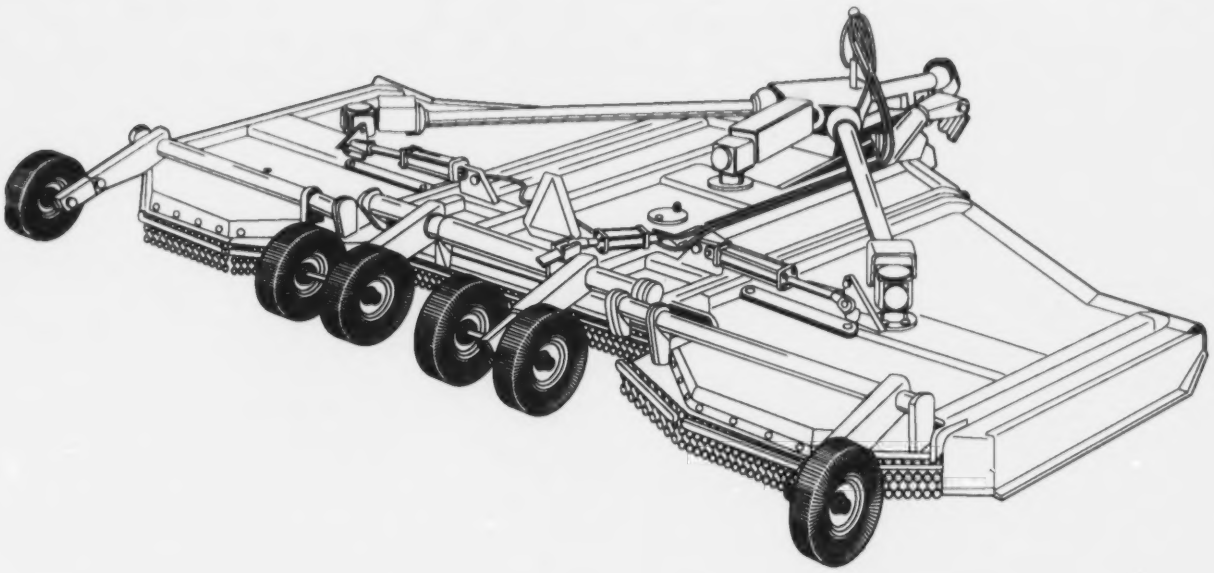
Farm Equipment Pictures

Tractor Loader

To be used with:
Mighty Machines

Name: _____

Farm Equipment Pictures

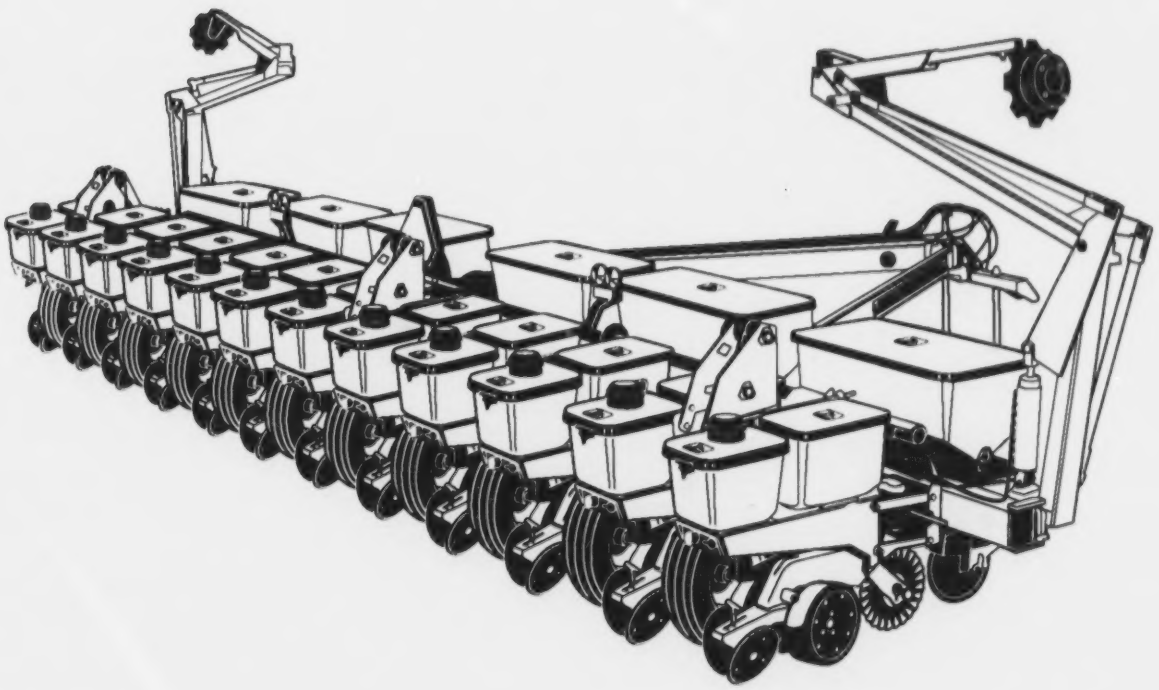


Mower

To be used with:
Mighty Machines

Name: _____

Farm Equipment Pictures

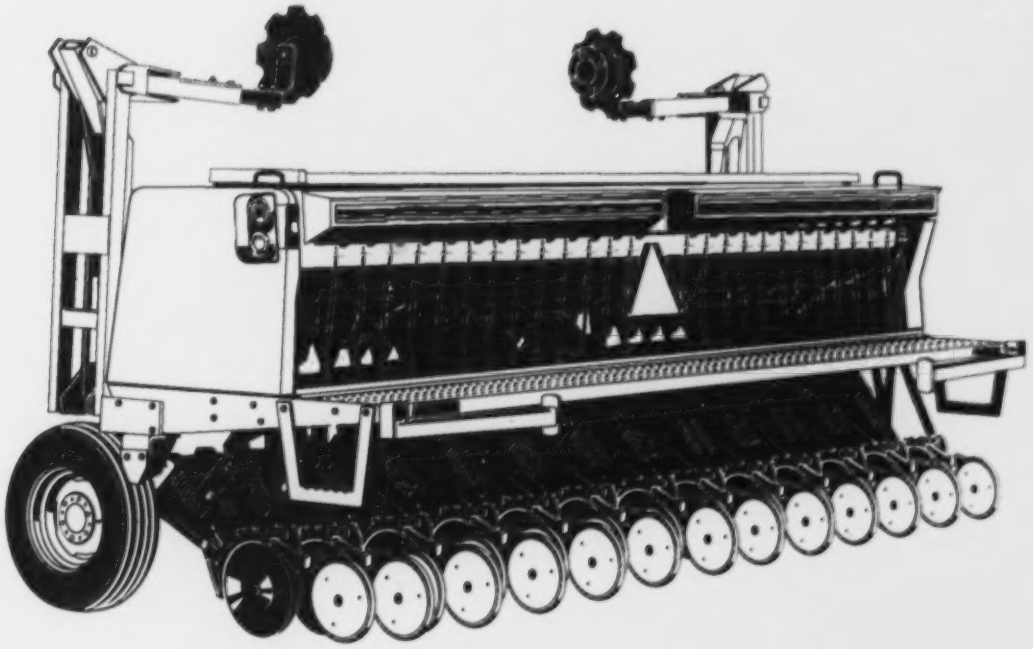


Corn Planter

To be used with:
Mighty Machines

Name: _____

Farm Equipment Pictures



Soybean Drill

To be used with:
Mighty Machines

Name: _____

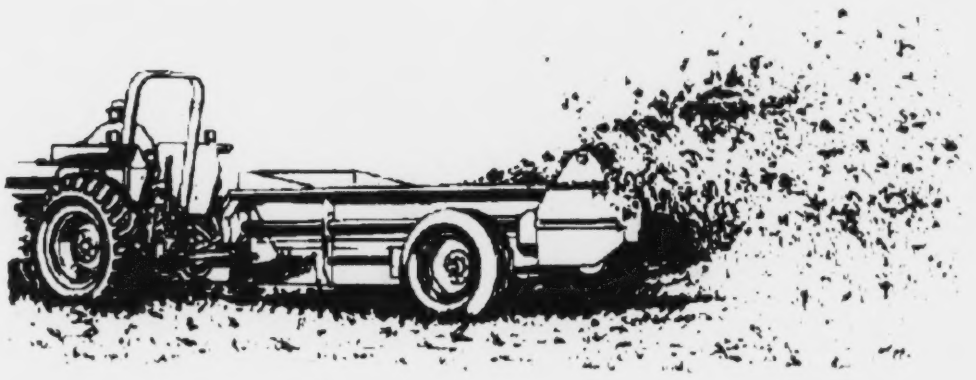
Farm Equipment Pictures

Hay Baler

To be used with:
Mighty Machines

Name: _____

Farm Equipment Pictures

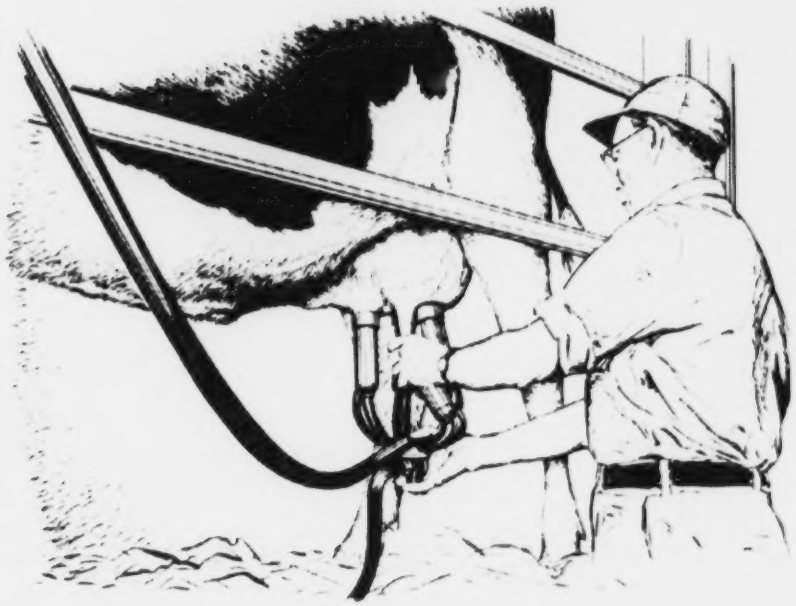


Spreader

To be used with:
Mighty Machines

Name: _____

Farm Equipment Pictures

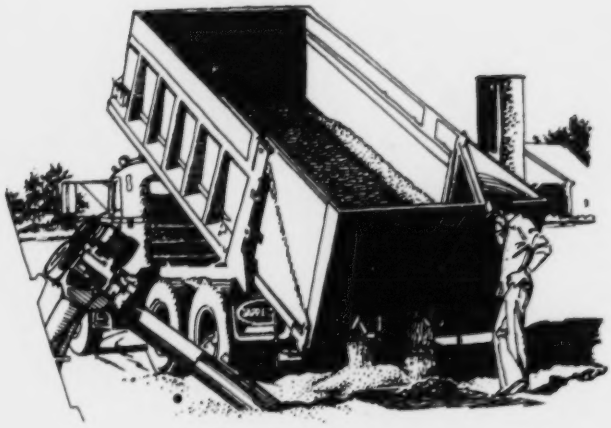


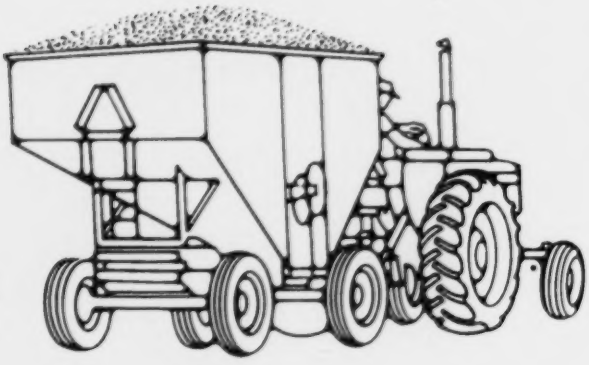
Milking Machine

To be used with:
Mighty Machines

Name: _____

Farm Equipment Pictures

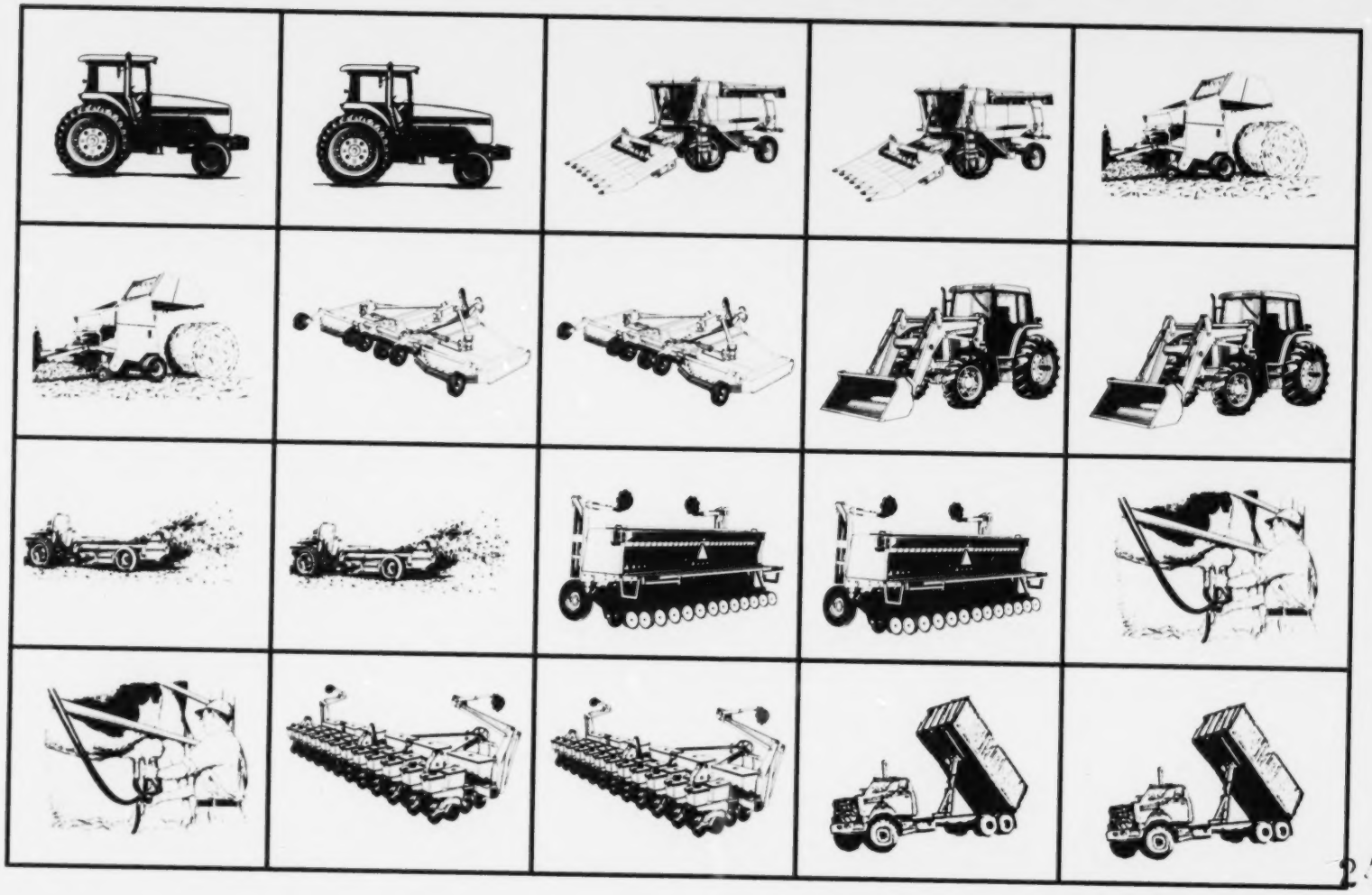




Grain Truck and Wagon

To be used with:
Mighty Machines

Farm Equipment Match-Up Game



From Cotton to Jeans

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

1. Give students an understanding of production, processing, and marketing cotton.
2. Teach students that cotton is a valuable resource and help them create paper to show one use of cotton.

Students:

1. Learn about the history, growth, and production of cotton.
2. Create paper from cotton linters.
3. Discuss the importance of cotton products to our world and the economics of its production.

Illinois Learning Standards: 5.A.1a; 12.A.1a; 12.B.1a; 13.B.1c; 13.B.1d; 15.C.1a; 16.C.1a(W); 17.C.1a; 25.A.1d

Introduction:

Cotton Has Been Around A Long Time - No one knows the exact age of cotton. Scientists searching caves in Mexico found bits of cotton bolls and pieces of cotton cloth that proved to be at least 7000 years old. When Columbus discovered America in 1492, he found cotton growing in the Bahamian Islands. By 1500, cotton was known generally throughout the world.

Cotton is an Important Crop - Today, the world uses more cotton than any other fiber, and cotton is a leading cash crop in the U.S. In 1997, the U.S. produced 18,793,000 bales of cotton. Cotton has hundreds of uses, from blue jeans to shoe strings. One bale of cotton can produce 21,960 women's handkerchiefs, 4321 mid-calf socks, 1217 T-shirts, 3085 diapers, 1256 pillow cases, or 690 terry bath towels. All parts of the cotton plant are useful. The most important is the fiber or lint, which is used in making cotton cloth. Plastics, explosives, and other products are made from cellulose which is provided by the linters—the short fuzz on the seed. Cotton is also used as a reinforcement material in bicycle tires, and cotton fibers are used in money and legal documents to make the paper stronger.

Cotton Growing Climate - Cotton grows in warm climates. In this country the 12 major cotton-producing states are Alabama, Arizona, Arkansas, California, Georgia, Louisiana, Mississippi, Missouri, New Mexico, North Carolina, Tennessee, and Texas. Some cotton is also produced in Florida, Kansas, and Virginia. Cotton yield in the U.S. averages approximately one and one-third bales per acre with a weight of about 500 pounds per bale, or 666 pounds of cotton per acre. This yield is about twice as much as in 1950 and is due to better land use, improved plant varieties, mechanization, fertilization, and irrigation. It also is a result of much better control of disease, weeds, and insects.

Growing Cotton - In the spring, the land is plowed and the soil is formed into rows. Farmers in south Texas plant cotton as early as February, but in more northern parts of the Cotton Belt, they plant as late as June. Seeding is done with a machine called a planter which covers as many as 10 to 12 rows at a time. Machines called cultivators uproot weeds and grass, which compete with the cotton plant for soil, nutrients, sunlight, and water. After the plant blossoms, the blooms wither and fall, leaving green pods called cotton bolls. Inside the boll, moist fibers grow and push out from the newly formed seeds. The fibers continue to expand under the warm sun. Finally, the fibers split the boll apart and the fluffy cotton bursts forth. The crop is harvested by machines.

Processing the Cottonseed - The cottonseed is crushed in order to separate its three products—oil, meal, and hulls. Cottonseed oil is used primarily for shortening, cooking oil, and salad dressing. The meal and hulls are used in livestock, poultry, and fish feed as well as in fertilizer. The stalks and leaves of the cotton plant are plowed under to enrich the soil.

Processing Cotton - In 1793, Eli Whitney invented the cotton gin. This machine separated the cotton fibers from the seed. This was a major improvement in cotton production because before that time, the fibers and seed were separated by hand. One machine could now separate fifty pounds of cotton a day instead of one pound by hand. Until about 150 years ago, cotton was always picked by hand. An experienced worker could pick about 450 pounds of cotton per day. This cotton still had the seeds inside. In 1850, a mechanical picker which used revolving spindles or barbed points to pull cotton from the cotton boll was first patented. In the 1930s, after experimentation and improvements, a mechanical cotton picker was used to pick 8000 pounds of cotton in one day. After it is picked, the cotton is baled and sent off to the textile mill where the fibers are cleaned and straightened. The fibers are formed into an untwisted rope, processed further, and wound onto bobbins as cotton yarn. Machines called looms weave cotton yarns into fabrics which are bleached, pre-shrunk, dyed, printed, and given a special finish before being made into clothing or products for the home.

Colored Cotton - A New Development - The breeding and production of cotton with naturally colored lint is a recent development in the cotton industry. Varieties of cotton have been bred so their lint color is shades of green, blue, and brown. With colored cotton the amount of fiber processing in the manufacturing of a finished color product decreases. The costly process of chemical dying is eliminated since the cotton will already have color. Cottons that are naturally colored maintain their color through many washings and fade little over time.

Materials Needed:

- Cotton bolls (See "Other Resources")
- Small scale
- Cotton garment
- Square of cotton material with unhemmed edges
- Microscope

Activity Outline:

1. Discuss cotton and the economics of the product. Where is it grown? How much is grown? What do the producers do with the cotton? How is cotton processed? Where are cotton products sold?
2. Tell students about the mechanical improvements in the cotton industry such as the cotton gin and the mechanical cotton picker. How would these inventions help the economics of cotton production? Can the students think of other mechanical improvements in the cotton industry? (spinning jenny, cotton mill machinery, irrigation systems, planters, cultivators, etc.)
3. Hold a "Hand-Ginning" contest in the class. Give the students seven minutes to separate the seed and fiber from a given amount of cotton. (See "Other Resources" to obtain cotton for your classroom.) When seven minutes are up, count the seeds and weigh the fiber that each student separated. How efficient is hand ginning? Ask the students if they understand why there was a need for the cotton gin to be invented.
4. Talk with the students about cotton weaving. After the cotton is spun into yarn, it is woven to create material. The yarns used for material are called warp or weft yarns. Warp yarns are those that run lengthwise and weft yarns run crosswise. With technology, cotton mills are able to produce up to 100 yards of material an hour per loom.
5. Show your students a garment made from cotton. Point out the warp and weft yarns.
6. Show your students a square of unhemmed cotton material. Pull individual threads away from the sides of the square and study the weaving of the cloth. The weft threads will be a different color than the warp threads. Look at the edge of the cloth under a microscope and examine the thread directions.

Discussion Questions:

1. Why is cotton an important crop?
2. Why is cotton a leading cash crop?
3. What are some products made from cotton?
4. How is cotton grown?
5. Why was the cotton gin important?
6. Why was the mechanical cotton picker important?

Related Activities:

1. Try this activity to demonstrate the weaving process of cotton on a loom:
   a. Find a square, scrap piece of wood to use as a loom.
   b. Place an even number of nails along all four sides, evenly spaced.
   c. Wrap knitting yarn back and forth along the top and bottom nails. These are the warp yarns, or lengthwise yarns.
   d. Weave another length of yarn over and under the existing yarn. These are the weft yarns, or crosswise yarns.
   e. Try other patterns with the weft yarn such as diagonal or crossing over several yarns.

Other Resources:

1. Cotton Kit or Primary Cotton Kit, Ag Experience, 3144 N. G Street, Merced, CA 95340, (209) 358-9057.
2. *Cotton's Journey From Seed to You: A Field Trip in a Box*, The Alaca Company, P.O. Box 55, Tranquility, California 93668, (209) 698-5190.

What's My Job?

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Assess the students' understanding of careers and agriculture and then introduce students to a variety of jobs.
2. Help the students understand that agriculture involves much more than traditional farming.

Students:

1. Learn what the words "career" and "agriculture" mean.
2. Choose a career in agriculture that interests them.
3. Demonstrate comprehension of the discussion about ag careers by drawing a picture of a typical day in an agricultural career of their choice.

Illinois Learning Standards: 4.B.1a; 4.B.1b; 5.A.1a; 5.A.1b; 16.C.1a(W);

Introduction:

More than 22 million people have careers in agriculture. Only two million people are traditional farmers but many people are involved in the process from farm to market. There are agriculture careers in agribusiness, communications, engineering, biotechnology research, government, education, computer science, processing, distribution, marketing, and many other areas. Some people have careers connected to agriculture, but they do not realize it! For example, sales representatives for food distributors, genetic researchers, and elementary teachers who teach topics such as plant and animal systems, are all involved in agriculture because their jobs relate to the food and fiber system.

Here are some jobs that you may want to discuss with your primary students to begin their understanding of careers in agriculture.

Agriculture Journalist – Journalists write news stories, manuals, scripts, and press releases for corporations. They may work for newspapers writing environmental stories or business stories about agricultural-based corporations. Some journalists are hired by research institutions and manufacturers.

Agriculture Teacher – Agriculture teachers are responsible for educating students, as well as conveying to them the pride and heritage of the agricultural industry. They also oversee projects and activities for agricultural youth groups, such as the National FFA Organization. They may teach at junior high, high school or college levels, or become education specialists.

Agronomist – Agronomists deal with field crops and soil management. They develop new varieties of crops, analyze soil structure, investigate soil chemistry, and study the physics of water movement in soil. Agronomists work for the USDA, banks, and seed companies. Some are forecasters, environmentalists, or teachers.

Livestock Farmer - Livestock farmers care for their animals by feeding them and keeping them healthy. Livestock farmers breed animals to genetically improve the quality of their animals. They keep accurate records of their animals. Livestock farmers may buy animals and bring them to their farm or raise their own. They sell their animals for meat and other products.

Crop Farmer - Crop farmers grow things such as corn, soybeans, wheat, oats, and vegetables. They plant their crops, care for them, and harvest them. They use machinery to perform many of their tasks and computers are also helpful. They may sell their crop at a market, take it to a grain elevator, or keep it to feed their livestock.

Ag Engineer — Ag engineers develop and improve farm equipment. Ag engineering has caused many advances in technology for agriculture. These advances allow farmers to work faster, have better crops, and ultimately feed and clothe more people.

Veterinarian — Veterinarians are people who watch animals for signs of sickness and care for them when they are sick. Livestock farmers often ask veterinarians to look at animals on their farm. Farmers and veterinarians work together to keep livestock healthy.

Materials Needed:

- Books about careers in agriculture such as *I Can be a Farmer* by Kathy Henderson, ISBN# 0-516-41923-4 (1989) or *Careers in Agriculture* by Christopher Benson, ISBN# 0-8225-0316-6 (1974).
- Paper, blank and writing
- Markers, crayons, or colored pencils

Activity Outline:

1. Discuss the word "career." Talk with the students about their parents' careers.
2. Discuss the word "agriculture." What is agriculture and what kinds of careers are in agriculture? Talk about the basic ag careers listed above. Since younger students may not be familiar with agriculture or what the word career means, explain the careers fully. Older students may be able to understand careers such as agribusiness managers, food scientists, ag journalists, youth program directors, soil scientists, etc.
3. Ask the students to choose the agriculture career that interests them the most. Talk with them about the types of things they would do each day as a crop farmer, livestock

farmer, veterinarian, ag engineer, journalist, or ag teacher. The school librarian may be able to help the class research careers or read books about various careers.

4. Ask the students to draw a picture of a typical day in their agriculture career. (For example: a student who chooses to be an ag engineer may draw a picture of someone studying building plans for combines.)
5. Older students can write a story or journal entry about one day in their agriculture career. They should write about the jobs they handled and the people they worked with that day.
6. Students can share their drawings and stories with the class. What career was the most popular? Talk about the training involved for different careers in agriculture.

Discussion Questions:

1. What do the words "career" and "agriculture" mean?
2. What are some careers in agriculture?
3. Do you have to come from a farm to have a career in agriculture?
4. What types of duties do careers in agriculture involve?

Related Activities:

1. Ask students to make a collage about careers in agriculture.
2. Ask students to write a newspaper want ad for an agricultural career. What are the skills and experience needed?
3. Ask students to choose a career in agriculture and then write a skit. The scene of the skit could be a class reunion where everyone talks about their jobs and what they're doing in life.
4. Ask students to write a radio jingle or TV commercial encouraging young people to pursue careers in agriculture.

Other Resources:

1. LIVING SCIENCE - A poster series about careers in agriculture, food, and natural resources. Each poster includes a description of the career and suggested school work. Food and Agriculture Careers for Tomorrow, 1140 Agricultural Administration Building, Purdue University, West Lafayette, IN 47907-1140.
2. "The Natural Career" - A brochure from the Illinois Farm Bureau® about careers in agriculture. Contact your county Farm Bureau® to receive a brochure.
3. "Your Big Break: Exciting Careers in a Growing Job Market!" - A brochure from Cenex Land O'Lakes about careers in agriculture. P. O. Box 64089, St. Paul, MN 55164-0089.
4. "Think About It" - A brochure from the National FFA Foundation, Inc. about careers in agriculture. National FFA Center, 5632 Mt. Vernon Memorial Highway, P. O. Box 15160, Alexandria, VA 22309-0160. http://www.ffa.org
5. "Grow a Great Life" - A brochure from the Society of American Florists about careers in horticulture. 1601 Duke Street, Alexandria, VA 22314. (800) 336-4743.
6. "Jobs to Start in, Careers to Grow in" - A brochure from the University of Illinois College of Agricultural, Consumer, and Environmental Sciences. http://w3.aces.uiuc.edu/AIM/Discovery/Careers/career.html

BEST COPY AVAILABLE

Soil: The Strength of the Prairie

Grade Level: K-3

Approximate Length of Activity: One class period (plus a few weeks for growing time)

Objectives:

Teacher:

1. Tie history, geography, science, and fine arts into one lesson about prairies, soil, and grass growth.
2. Teach students to compare science experiments by discussing differences and similarities.

Students:

1. Learn about the human settlement in Illinois prairies.
2. Learn about the plants and animals of the prairies.
3. Discuss the value of nutrient-rich soil for agriculture.
4. Compare grass growth by discussing differences and similarities between student's experiments.

Illinois State Goals for Learning: 15.C.1a; 15.C.1b; 16.C.1a(W); 17.A.1a; 17.B.1a; 17.B.1b; 17.C.1a; 17.C.1b; 18.C.1; 26.A.1e; 26.B.1d

Introduction:

Prairies are grasslands where trees are absent or widely scattered. Prairies can be found all over the world: Venezuela, Argentina, Brazil, Asia, Africa, Australia, and many more places. About 32 to 40 percent of the world's land is or was covered by grasslands. In North America, grasslands cover 15 percent of the land surface. There are three main prairie types in North America: the tallgrass prairies in the wet eastern regions, the mixed-grass prairies of the central Great Plains, and the shortgrass prairies of the rain shadow of the Rockies. Illinois is in the tallgrass prairie region where the grasses sometimes reach a height of 10 feet or more.

Before European settlement, Illinois had 22 million acres of prairie land, which was over 60 percent of the state. When European settlers first moved into the prairie areas, they thought the prairies were infertile because there were no trees. They built their homes at the edges of prairies and along rivers where trees were found. Before long, they realized that the prairie soil was more fertile than forest soil. The prairie lands of Illinois are among the most productive soils in the world. The settlers had plows made for forest soils, but it was hard to cut through

the prairie sod. When John Deere invented the self-scouring, steel-bladed plow in 1837, farmers were able to break the prairie sod and farm the land. In about 50 years, much of the prairie land of Illinois was converted to agricultural use.

Today Illinois has about 2000 acres of prairie land. Some prairie plants found in Illinois are blue-eyed grass, bluestem, butterfly weed, black-eyed Susans, coneflowers, blue grama grass, wild hyacinth, milkweed, prairie clover, switchgrass, wild indigo, and sunflowers. Several prairie restoration projects are taking place. Prairie restoration is purposefully assembling plants and animals to reconstruct an environment similar to the original prairies. The steps to prairie restoration include: site preparation (working with soil, weeds, etc.), seed selection and storage, planting, and fire (beneficial to new growth).

Materials Needed:

- "Soil-Sam Diagram" sheet
- Baby food jar
- Knee-high stocking (not reinforced toe)
- Grass seeds
- Potting soil
- Plastic jiggle eyes
- Felt
- Water
- Fabric (optional)
- Lace (optional)
- Large jar/container

Activity Outline:

1. Discuss the above information about prairies.
2. Show the students a Soil-Sam that you have already made. (Use the directions below to make your own. A "Soil-Sam Diagram" is included with this lesson for your use.) Tell the students that the hair of the Soil-Sam is grass.
3. Have the students make their own soil people. Using a knee-high stocking, place some grass seeds in the toe where you want the grass to grow. The toe of the stocking will be the head of Soil-Sam and the grass will look like hair when it grows.
4. Pack three-fourths of a cup of soil in the end of the stocking on top of the seeds. Make sure there is enough soil so the quantity of the soil is slightly bigger than the opening of the baby food jar.
5. Tie a knot in the stocking under the ball of soil.
6. Place the top of the stocking (which is the bottom of Soil-Sam) in a baby food jar filled with water.
7. The stocking will absorb the water and saturate the head of Soil-Sam which is above the mouth of the jar. The grass seeds should germinate through the stocking. You may have to cut a few small holes to aid in this step.

8. To decorate, cut a round piece of fabric to fit over the mouth of the jar. You can decorate the fabric with lace.
9. Glue jiggle eyes on the face and cut out felt for a mouth.
10. The soil people should be watered as needed. You can cut the "hair" and style as desired.

Discussion Questions:

1. Name some prairie plants and animals of Illinois.
2. Why are prairie lands used for agriculture? (The soil is some of the best in the world.)
3. Why were farmers able to farm the prairie lands after 1837?
4. Discuss the growth of the soil people. How many days did the grass seeds take to sprout? When did they need haircuts? Does your Soil-Sam look like other students' soil people, etc.?

Related Activities:

1. Read *If You're Not From the Prairie...* by David Bouchard
2. Ask students to bring old large socks to school. Go on a field trip to a prairie and ask students to place the socks over their shoes. Examine and identify the prairie seeds, plants, and other materials when you go back to your classroom.
3. Identify prairie plants and animals and then go on a photo scavenger hunt for them.

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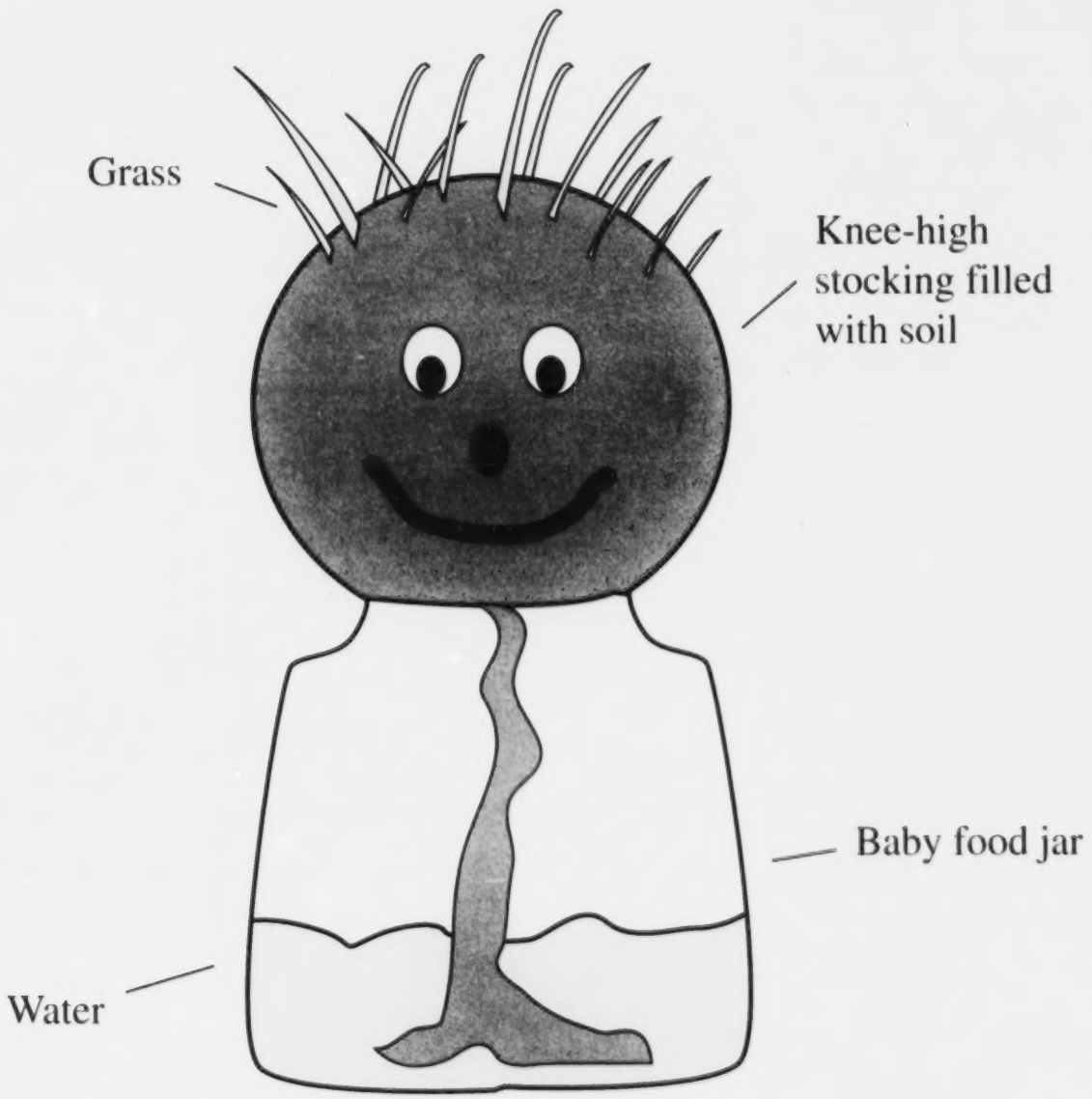
To be used with:
Soil: The Strength of the Prairie

Soil - Sam Diagram



Food...Can You Handle It?

Grade Level: K-3

Approximate Length of Activity: 20 minutes

Objectives:

Teacher:

1. Teach students safe food handling techniques to use in their homes.
2. Help students learn of safe food handling techniques used in grocery stores and restaurants.
3. Teach students about the causes of food spoilage, food-borne illness, and methods of food preservation.
4. Use an activity to show students the importance of hand washing.

Students:

1. Learn that restaurants and grocery stores have strict food safety guidelines.
2. Learn the causes of food-borne illness from foods.
3. Distinguish safe food handling techniques from unsafe techniques.
4. Use their experience with food at home to generate positive food safety rules.
5. Know the importance of hand washing.

Illinois Learning Standards: 11.A.1a; 22.A.1b; 22.A.1c; 22.B.1; 22.C.1; 23.B.1; 24.B.1

Introduction:

Grocery stores and restaurants are agribusinesses. Agriculture is the growing of food and fiber, and restaurants and grocery stores provide food for sale to us. So therefore they are agribusinesses. Grocery stores and restaurants must follow many health standards concerning food safety. They are responsible for providing us with quality, safe food. Health inspectors routinely inspect these agribusinesses to make sure they are following the guidelines. If health inspectors find that an agribusiness is not, they can penalize them by closing the business for a specific amount of time or perhaps indefinitely.

In the United States, we are fortunate to have a government that makes food safety a priority. In some countries, food may be produced or imported, but it is spoiled by pests or microorganisms due to poor storage. Pests (insects and rodents) and microorganisms (bacteria, mold, yeast) are the two chief causes of food spoilage. Food must be transported, stored, and prepared correctly to ensure safety. Agribusinesses that deal with food must know where their

food is coming from. They must also know how their food was grown and how it was transported.

All food will spoil if it is not preserved in some way. Some foods such as nuts and grains can be stored for a long time without spoiling. Other foods such as bread and milk must be consumed quickly. Foods can be preserved in many ways. Canning, freezing, and dehydrating are just a few methods. Spoilage may occur before there is a change in taste or odor. Therefore, consumers should read expiration dates before eating food products bought from grocery stores.

People can reduce their risk of food-borne illness by handling it properly. Eighty-five percent of the cases of food-borne illness, a sickness caused by bacteria, can be avoided with proper food handling. Keys to food safety are washing hands, checking expiration dates, washing surfaces and utensils with hot, soapy water, refrigeration and freezing, rinsing fruits and vegetables, and storing foods in proper places.

Materials Needed:

- "Food Safety" worksheet for each student
- Cooking spray or vegetable oil
- Cinnamon
- Soap
- Paper towels
- Warm faucet water
- Cold faucet water

Activity Outline:

1. Ask the students to complete the worksheet entitled "Food Safety." Through this worksheet, students will learn safe food handling practices and draw illustrations for their own safe food handling practices.
2. Talk with the students about safe food handling practices at their homes. Do they thoroughly wash dishes? Do they refrigerate food properly? Do they look for expiration dates on packages? Do they wash their hands with soap and warm water?
3. Use this activity to show students the importance of washing hands with soap and warm water.
    a. Apply cooking spray or vegetable oil to each student's hands.
    b. Sprinkle cinnamon on the palms, backs, and in-between each student's hands. The cinnamon represents germs that get on our hands.
    c. Try to get rid of the cinnamon using only cold water. Discuss the results.
    d. Try to get rid of the cinnamon using soap and cold water. Discuss the results.
    e. Try to get rid of the cinnamon using soap and warm water. The cinnamon "germs" will rinse right off of the students' hands and into the sink.

f. Ask the students why the cinnamon stayed on their hands until they used soap and warm water. How is this similar to washing germs off of our hands? Is it important to use soap and warm water for hand washing?

Discussion Questions:

1. What are the chief causes of food spoilage?
2. What are some safe food handling practices that can be used in your home?
3. What are some food preservation methods that are used before foods reach the grocery store?
4. What responsibilities do agribusinesses such as grocery stores and restaurants have?
5. Why is it important to use soap and warm water when washing your hands?

Related Activities:

1. Tour a restaurant. What types of food safety precautions are used?
2. Add a slice of bread and a little water to a sealable plastic bag. What happens? Chart your observations over time.

Other Resources:

Food for America, A Resource Guide, National FFA Organization, 6060 FFA Drive, P. O. Box 68960, Indianapolis, IN 46268. 1-888-332-2668.

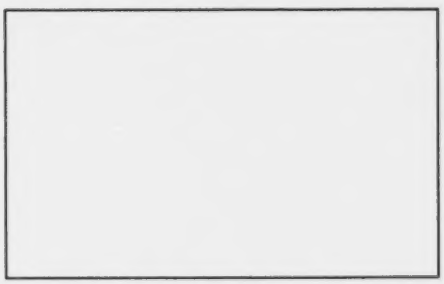
To be used with:
Food . . . Can You Handle It?

Name: _____

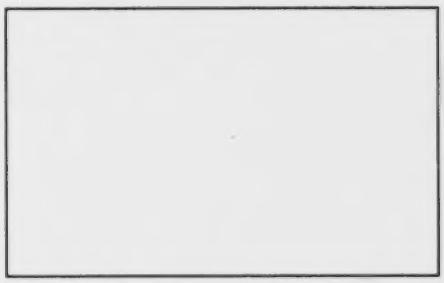
Food Safety

Draw a picture for each statement that shows the right method and the wrong method. (Example for #1 – Someone washing their hands vs. someone sitting at a table with dirty hands.)

1. Always wash your hands before handling food.

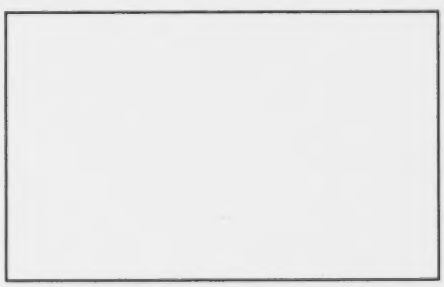


Right



Wrong

2. Eat food before the expiration date on the package.



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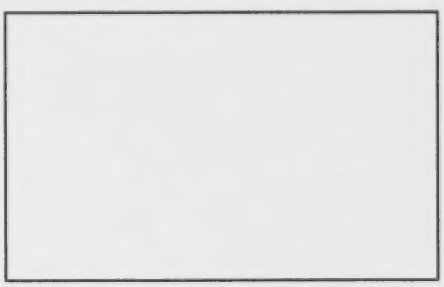
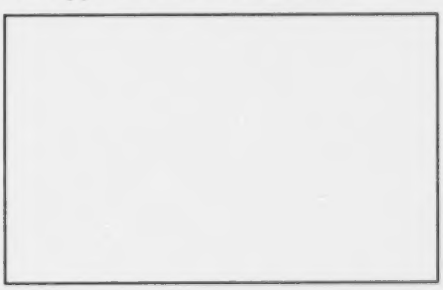


Wrong

3. Do not cut meat and vegetables on the same surface or with the same knife. Wash the surface with hot, soapy water to kill bacteria.



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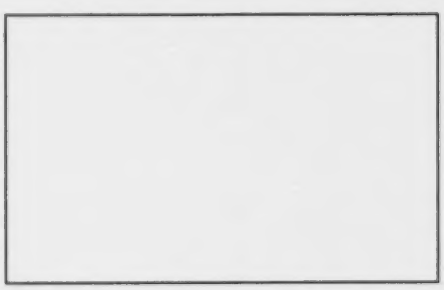
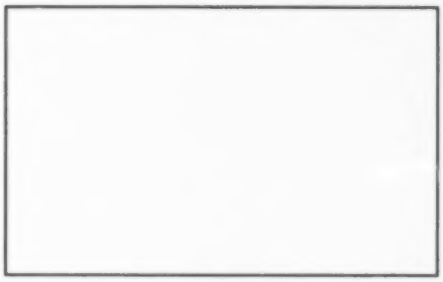


Wrong

4. Refrigerate or freeze foods that spoil.

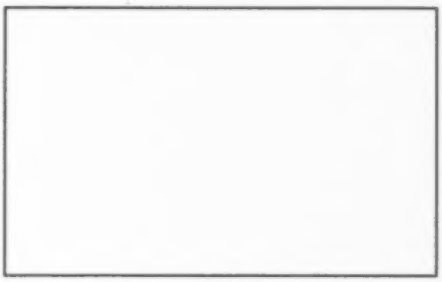
Right



Wrong

5. Rinse fruits and vegetables before eating or cooking.

Right



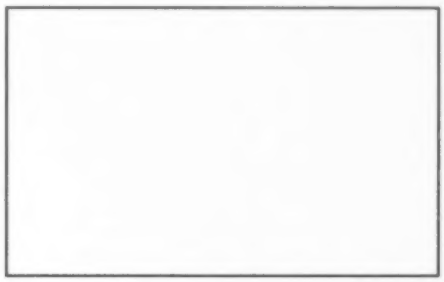
Wrong

6. What are some other food safety methods? Draw right and wrong pictures for these methods.

Right

Wrong

Right



Wrong

Why Do People Raise Sheep?

Grade Level: K-3

Approximate Length Of Activity: Five class periods

Objectives:

Teacher:

1. Make students aware of the products and by-products we use that come from sheep.
2. Teach students the difference between "man-made" and "natural," as well as "renewable" and "nonrenewable" resources.

Students:

1. Learn what products and by-products come from sheep.
2. Explain the difference between man-made and natural fibers.
3. Understand the difference in renewable and nonrenewable resources.

Illinois Learning Standards: 11.A.1f; 12.A.1a; 12.B.1a; 12.B.1b; 13.A.1c;15.B.1

Introduction:

Because sheep can feed nearly anywhere and provide wool as well as meat, men have taken sheep along on their migrations. The Spanish explorers brought sheep to the New World on their voyages of exploration. Colonists and settlers found sheep invaluable as a source of good quality protein (meat) and wool for clothing. The wool from sheep can be used to make clothing that protects us much in the way the wool protects sheep from severe weather. Not only do sheep provide a supply of meat, many of the by-products are used by a number of American industries. Other by-products are used in the manufacturing of many consumer items, which are enjoyed by and contribute to our health and convenience.

Sheep are animals that help our environment in many ways. Sheep do not have any top front teeth, so when they pull out grass and weeds to eat, they do not pull out the roots of the plants. This helps the roots to grow a new plant. Plus, sheep are used in many areas where brush needs to be controlled. Many areas of the United States have problems controlling underbrush in forests and other areas. When there is too much underbrush, under the right conditions forest fires can easily begin. In order to prevent these fires, the U.S. Forest Service uses sheep to feed on the brush. This helps to prevent forest fires and save hundreds of trees, plants, and wildlife.

Another interesting characteristic about sheep is that they have split hooves to help them move about and climb rocky areas (such as those in forests!). But these split hooves also help to break up the soil. This helps spread seeds so new plants will grow. It also helps plants and other vegetation to obtain water and nutrients better because the soil has been loosened.

Sheep provide us with food and fiber. Sheep provide meat called lamb or mutton and fiber that is called wool. Lamb and mutton are very nutritious. They provide protein, iron, B-vitamins, and zinc. These nutrients help us to build muscles and strong bones, give us energy, and make our hair shiny. The wool that sheep provide is used to make clothing and rugs. Plus various parts of sheep are used to make many items such as yarn, insulation, tennis balls, baseballs, upholstery, chewing gum, industrial oils, stearic acid, cosmetics, ceramics, medicines, crayons, candles, creams and lotions, surgical sutures, piano keys, adhesive tape, buttons, ice cream, shampoo and conditioner, crochet needles, and much more!

Wool is harvested by shearing, or cutting, the wool off of the sheep. The wool of sheep makes a very interesting fabric. Items made with wool are wear-resistant. This means that wool can keep its shape when it comes to wear and tear. Wool is a good absorber. Because of this, wool will soak up dyes very well. Wool also absorbs water and still keeps the skin feeling dry. This occurs because an air pocket surrounds the skin and makes the skin feel comfortable. So even if the wool is wet, the skin feels warm and dry.

Materials Needed:

- "Sheep or No Sheep Cards"—one set per student
- Man-made or Natural Fiber Guessing Board (instructions in Activity 2)
- Samples of wool, acetate, polyester, and cotton for experiments (1/4 yard each - can obtain from a fabric store)
- Wooden clothespins—one per group
- Metal hangers—one per group
- Matches
- Half teaspoon measuring spoons
- Cups or petri dishes—three per group
- Water
- Drawing paper

Activity Outline:

Activity 1

a. On half sheet of paper, have the students draw a picture of a sheep. On another half sheet of paper, have the students draw a picture of a sheep with a line going through it (like the "Ghostbusters" symbol.)
b. Give one set of "Sheep or No Sheep Cards" to each student. They should be cut apart on the solid line.
c. Ask the students to group the pictures into two groups–the products that are made from sheep products should be placed under the picture of the sheep. The products that do not come from a sheep should be placed under the "no sheep" picture.
d. Remind the students that this is their guess and that most likely no two people will agree on exactly the same groupings.

e. Make a class graph (picture or bar) of the guesses.
f. Determine which of the picture cards represent products made from sheep. (The products from sheep are china, steel knives, asphalt road, tires, cheese, string instruments and drums, syringes and medicines, wool coat, camera and film, fire-resistant, marshmallows, cosmetics, soap, leather goods, and lamb meat.)

Activity 2

a. Man-made or Natural? Obtain eight to 14 different kinds of fabric pieces each about 2"x 3" – some natural and some man-made. Fabric store employees should be able to help you. Make sure that you have samples of silk, cotton, and wool—the three main natural fibers. Glue samples on a board and number each piece of fabric. This is your Man-made or Natural Fiber Guessing Board.
b. Discuss the difference between man-made and natural products. Man-made products do not exist on the earth in natural form. Natural products can exist on the earth, somewhere, without the assistance of man. For example, coal and crude oil are natural substances, but the products made from crude oil such as asphalt and gasoline are man-made.
c. Have each of the students examine the different fabrics and guess which ones are man-made and which are natural.
d. Discuss the answers with your students. (Silk comes from the cocoons of silkworms. Silkworms eat mulberry leaves. Cotton comes from a plant. Wool comes from sheep.)
e. Explain to your students that the natural fibers on the fabric board are renewable rather than nonrenewable—fabrics can be obtained over and over again relatively easy. Synthetic fabrics are usually made from petroleum, which is nonrenewable. Discuss why some people believe that only natural fibers should be used for clothing—there are pros and cons to this issue.
f. Discuss how each of the fabrics feels. Are there differences in how the man-made vs natural fibers feel or has man been able to make good imitations of the natural products?

Activity 3

a. Ask the students to think about "wool and rain" and "wool and perspiration." Have them make predictions about how wool reacts with water on a data and results page. Ask the students how their predictions could be tested. Perhaps you could suggest the following procedure.
b. Cut a piece of wool and a piece of acetate into rectangles approximately 2"x3." All rectangles should be the same size.
c. Place each sample into a separate cup or petri dish.
d. Pour a half teaspoon of water onto each sample and let them sit long enough so that all of the water is absorbed. The entire samples should be wet but not dripping wet. Squeeze out any excess water.
e. Remove each sample and place it on a person's arm. For comparison reasons, it is best to have both samples on the same arm at the same time. Each person in the group should actually experience the feel of the materials.

f. Observe and discuss the following:
    1. What did the two fabrics feel like on the skin?
    2. Which fabric felt the wettest? Driest?
    3. Which fabric felt the warmest? Coldest?
    4. Did any of the fabrics stick to the skin?
    5. Why do you think wool is a desirable fabric for clothing?
    6. Record what was learned on a data and results page.

(Teacher's Note: The wool should have felt the driest and the warmest. The acetate should have felt the wettest and the coldest. Wool fibers have scales on the outside of the fiber and are able to absorb moisture to the inside of the fibers. This allows wool to absorb 30 percent of its weight in water. Since the water is absorbed to the inside of the fiber, an air pocket surrounds the skin and makes the skin feel comfortable. The skin feels warm and dry even if it's wet. This air pocket also helps during hot weather too—a person can perspire more, which helps him/her to cool down, because the wool absorbs the moisture. Cotton and acetate do not absorb moisture into the center of their fibers; therefore, a person feels cold and wet when they are exposed to moist fibers.)

Discussion Questions:

1. Name three products that come from sheep.
2. What is the difference between "man-made" and "natural?"
3. Explain the difference between "renewable" and "nonrenewable." Why do we consider wool to be renewable?
4. Which fabric stuck to your skin?
5. Which fabric seemed the driest?
6. What are some ways that sheep help the environment?
7. What is something interesting that you learned about sheep that you did not know?

Related Activities:

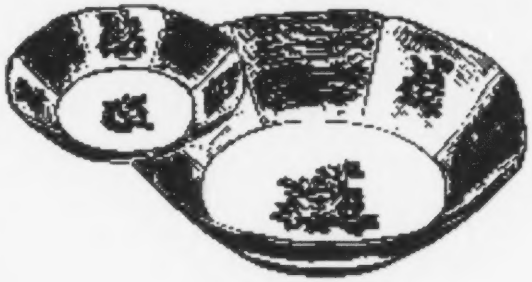
1. Contact your county Farm Bureau® to find out information about visiting a sheep farm or bringing sheep to your school.
2. Show a video of a sheep being shorn.
3. Read *A New Coat for Anna* by Harriet Ziefert and or *Charlie Needs a New Cloak* by Tomie dePaola. (These books show the fleece-to-fabric process.)
4. Show the students a world map or a transparency of the world. Color in or mark Australia, Russia, New Zealand, Argentina, South Africa, and United States. Ask students if they know what these nations have in common. (They are the top six wool producing countries of the world in rank order.)

Other Resources:

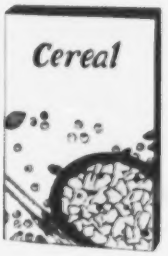
1. "Simply Sheepish." *Ag Mag* 13 from the Illinois Farm Bureau®—This colorful issue talks about selling sheep, shearing sheep, lambs, spinning wool, and careers with sheep. Contact your county Farm Bureau® to receive free copies for your classroom.
2. *From Fiber to Fabric ...Wool's a Natural* video, $12 plus shipping. American Wool Council / American Sheep Industry Association, 6911 South Yosemite, Englewood, CO 80112-1414, (303) 771-3500.
3. *Sheep on the Farm-A Video Field Trip*, a homemade production for $5.00. Ag Experience, 3144 N. G Street, Merced, CA 95340, (209) 358-9057.

To be used with:
Why Do People Raise Sheep?

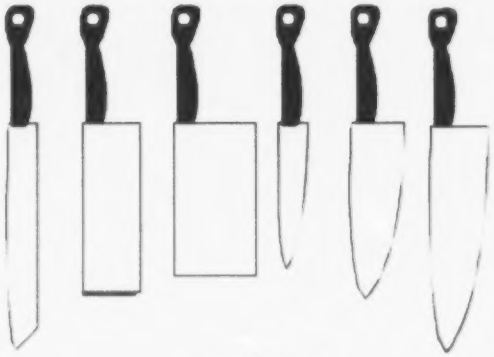
Sheep or No Sheep Cards



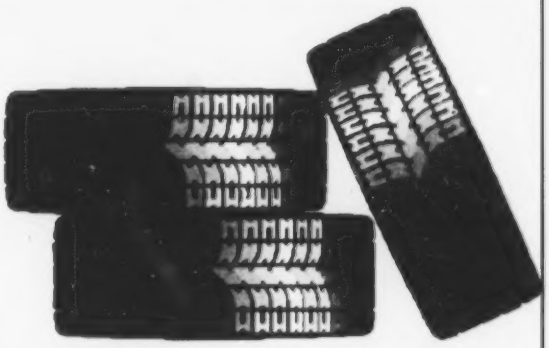
china



cereal



steel knives

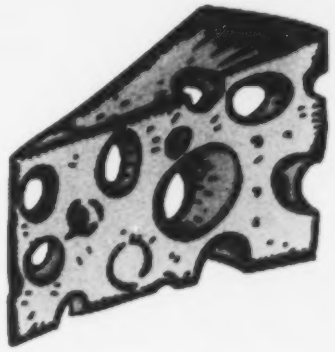


tires

asphalt road

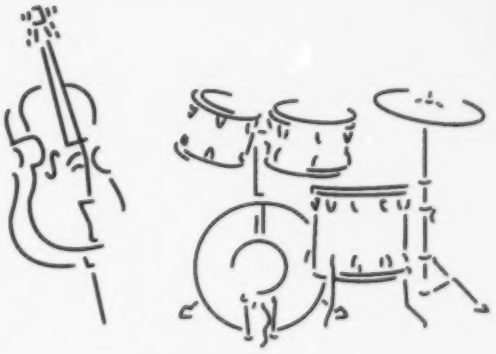
fish

To be used with:
Why Do People Raise Sheep?



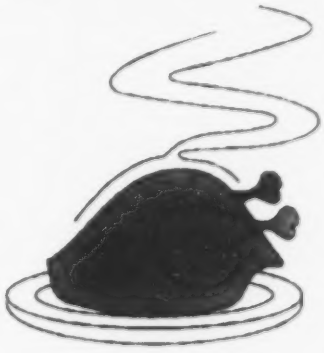
cheese

syringes & medicines



string instruments and drums

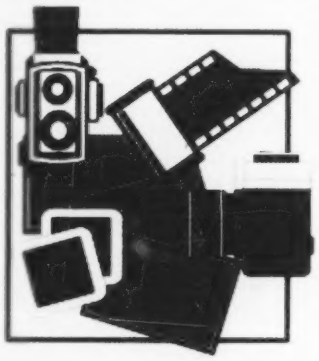
apples



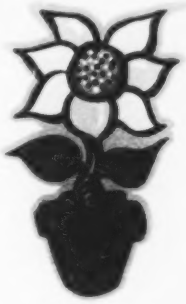
chicken

wool coat

To be used with:
Why Do People Raise Sheep?

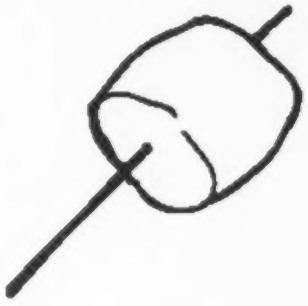


camera & film



flowers

milk

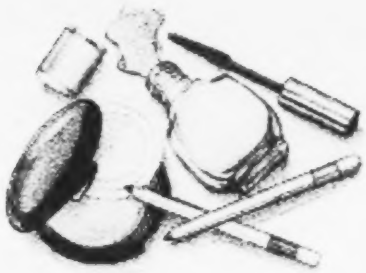


marshmallows

fire - resistant

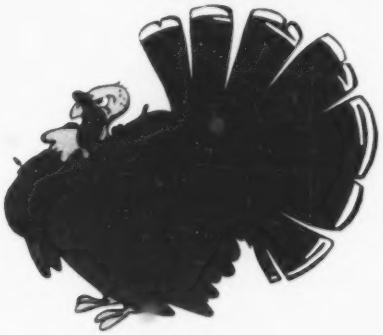
eggs

To be used with:
Why Do People Raise Sheep?



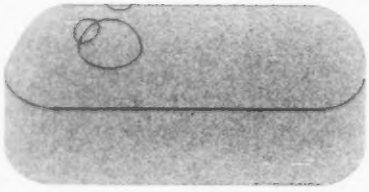
cosmetics

fruit

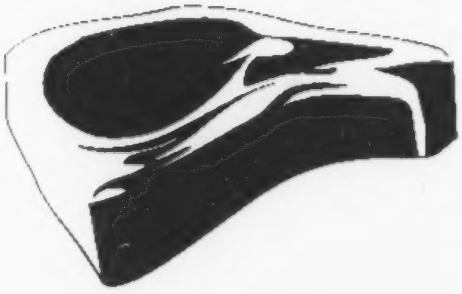


turkey

leather goods



soap



lamb meat

Beef Product Dash

Grade Level: K-3

Approximate Length of Activity: 45 minutes

Objectives:

Teacher:

1. To teach students about beef production and beef by-products.
2. To teach students about the nutritional value of beef.
3. Guide students in a game to test their knowledge of beef by-products.

Students:

1. Learn about beef cattle and answer questions about beef production.
2. Demonstrate an understanding of beef by-products by playing a game.
3. Learn about the nutritional value of beef to humans.

Illinois Learning Standards: 12.A.1a; 22.A.1b; 23.A.1; 23.B.1

Introduction:

Beef cattle are grown on more than half-a-million farms and ranches in the U.S. Many of the beef cattle ranches in the U.S. are in the West. Today, the production of beef involves ranchers, farmers, feed-lot operators, meat packers and processors, truckers, and retailers.

People in the U.S. consume about 16 billion pounds of beef - or 62 pounds per person - each year. The breeds of cattle used today have been crossbred for uniform and desirable characteristics. That improves the quality of the farmer's product. The ratio of fat to muscle, the animal's resistance to disease, and improved growth rate are characteristics that farmers have worked to improve through genetic selection.

After a cow is bred, nine months pass before the calf is born. As the young calf grows, it nurses from its mother and also nibbles on grass and grain. After weaning, calves are sometimes sold from the farm where they were born and sent to feed-lots to grow to maturity. In Illinois, it is common for the same farmer to produce and raise the calf to maturity. Calves often eat a ration of silage or hay-grain through the winter. In spring, the cattle are switched to high-energy diet, based on corn and protein supplements, such as soybean meal.

After 18 months to two years years, cattle are ready for market. They weigh about 1000

pounds and by then have eaten 50 bushels of corn, two and one-half tons of silage, 300 pounds of hay, and 360 pounds of food supplements.

Almost the entire beef animal can be used to benefit man in some way. From a typical 1000 pound steer, 400 pounds are used for beef that we eat and the remaining 600 pounds are used as by-products.

These are some common types of beef: pot roast, sirloin steak, ground beef, rib eye steak, and tenderloin steak. Beef is a good source of protein (which builds, maintains, and repairs body tissues), iron (which helps the red blood cells carry oxygen to body cells and tissues), zinc (which is a mineral used for growth and maintaining the immune system), and B-vitamins (which promote healthy skin, keep the nervous system healthy, and are important for digestion and metabolism).

Beef by-products are anything made from a beef animal other than beef. You probably use more beef by-products than you think! Here are some examples:

Bone, Horn, Hooves, & Gelatin

Combs, gelatin candy (Gummy Bears), marshmallows, mayonnaise, gelatin, photographic film, steel ball bearings, fine bone china, pet food, and vitamin capsules/gel coatings.

Hide & Hair

Insulation, paint brushes, glue for bookmaking and band-aids, clothes, shoes, luggage, saddles, furniture, automobiles, volleyballs, basketballs, and baseball gloves.

Fats & Fatty Acids

Shampoo, soaps, shaving creams, cosmetics, deodorants, candles, crayons, floor wax, detergents, hydraulic brake fluid, plastics, insecticides, paints, perfumes, and synthetic rubber.

Surprisingly, the sports equipment industry uses over 100,000 cattle hides each year to make things such as footballs, soccer balls, baseball gloves, and basketballs. Think about all the other beef by-products that are used for sports activities! (Band-Aids™, photographic film, shoes, deodorants, etc.)

Materials Needed:

- Beef by-products
- Three cardboard boxes
- Marker
- Whistle
- Gymnasium or large play area
- Stopwatch

Activity Outline:

This activity is a fun workout that also teaches the importance of beef production.

1. Give students a list of the products of beef animals, similar to the list above.
2. Tell the students to go on a scavenger hunt around the classroom and their homes to find beef products.
3. Discuss the items found and what part of the beef animal they come from.
4. Put the collected beef products and about the same amount of non-beef products together in a box. Label two other boxes "Team A" and "Team B." Place all three boxes at one end of the gymnasium or play area.
5. Divide the students into two teams positioned on the opposite side of the room from the three boxes.
6. Tell the students they are going on a "beef product dash." When the whistle is blown, the first person from each team will run across the gym to the box with mixed beef products and non-beef products. The student will find ONE beef product and place it in the team box. The student will run back to the team and send on the next student. The game is timed for a certain amount of minutes. (Make sure there are plenty of items in the box!) When time is up, the team with the most beef products in their box wins. Stress to the students that they must know their beef products, and also be quick, to win the game!
7. As an added extension, you may want to discuss how many total calories and calories per individual were burned during the game.

Discussion Questions:

1. What is the main use of beef cattle?
2. Name some beef by-products.
3. What types of people do cattlemen conduct business with?
4. Describe beef production.

Related Activities:

1. Students can read *Your Calf: A Kid's Guide to Raising and Showing Beef and Dairy Calves*, by Heather Smith Thomas.
2. Compare the nutritional value of beef to other types of food.

Build a Pyramid Diet

Grade Level: K-3

Approximate Length of Activity: One to two class periods

Objectives:

Teacher:

Build a food pyramid with students to enhance the students' understanding of food products, their production, and the food's nutritional value.

Students:

Become aware of the food pyramid, food products of the pyramid, and proper nutritional diets.

Illinois Learning Standards: 22.A.1b; 22.B.1; 23.B.1

Introduction:

The Food Guide Pyramid from the United States Department of Agriculture displays how to eat a variety of foods for a healthy body. Our bodies will get the nutrients they need if we follow the Food Guide Pyramid. The Food Guide Pyramid tells us how many servings we need of each food group. The Food Guide Pyramid suggests that we eat six to 11 servings of bread. One serving of bread is one slice of bread, one ounce of cereal, or a half cup of rice or pasta. In the next layer, the Food Guide Pyramid suggests that we eat three to five servings of vegetables and two to four servings of fruits. One serving of vegetables is one cup of raw leafy vegetables or a half cup of other vegetables. One serving of fruit is one medium apple, banana, or orange, a half cup of chopped, cooked or canned fruit, or one-half cup of fruit juice. Up another level are the meat and dairy categories. We should eat two to three servings of meat, fish, poultry, eggs, dry beans, or nuts and two to three servings of milk, yogurt, and cheese. One serving of meat is two to three ounces of lean meat, one cup of dry beans, one egg, or four tablespoons of peanut butter. One serving of milk is one cup of milk or yogurt or one and one-half ounces of cheese. Oils, fats, and sweets are at the top of the Food Guide Pyramid. They should be eaten sparingly because they have little nutritional value and will store as fat if the excess energy is not used. This lesson is to contrast the proper diet and eating habits with the construction of an "unbalanced" pyramid representing the typical American diet today.

Materials Needed:

- "USDA Food Pyramid vs. Actual Consumption" worksheet
- "What I Eat" worksheet
- 29 kindergarten building blocks or 29 shoe boxes
- Construction paper or paints (if using shoeboxes)
- Magazine pictures of food (to decorate boxes or blocks)

Activity Outline:

1. If you are using shoe boxes for this activity, you will need to cover them in the appropriate color of construction paper or paint them with paint. You will need the following shoe boxes or building blocks: 11 brown, 5 green, 4 orange, 3 white, 3 red, and 3 yellow.
2. After the shoeboxes have been painted or covered with construction paper, or the building blocks are gathered, the model of the pyramid is ready to be built.
3. Stack the boxes or blocks in rows, starting at the bottom.
    a. Row 1: 6 brown boxes
    b. Row 2: 5 brown boxes
    c. Row 3: Starting from the left - 3 green boxes plus 2 orange boxes
    d. Row 4: Starting from the left - 2 green boxes plus 2 orange boxes
    e. Row 5: Starting from the left - 2 white boxes plus 2 red boxes
    f. Row 6: Starting from the left - 1 white box plus 1 red box
    g. Row 7: 2 yellow boxes
    h. Row 8 : 1 yellow box

    The 11 brown boxes represent the bread, cereal, rice, and pasta group. The 5 green boxes are for the vegetable group. The 4 orange boxes are for the fruit group. The 3 white boxes represent the milk, yogurt, and cheese group. The 3 red boxes are for the meat, dry beans, eggs, and nuts group. The 3 yellow boxes are for fats, oil, and sweets.
3. Have the students paste colorful pictures of foods from magazines on the correct boxes of the pyramid.
4. Pass out the "USDA Food Pyramid vs. Actual Consumption" worksheet. As a class, compare the food pyramid with the unbalanced pyramid that represents what people actually consume.
5. Pass out the "What I Eat" worksheet. Have children complete the worksheet by listing what they eat for one day and comparing it to the pyramid.

Discussion Questions:

1. Which is the largest food group?
2. Can you name a food from each group that is grown by Illinois farmers?
3. Do you feel you have a diet representing the proper food pyramid on most days?

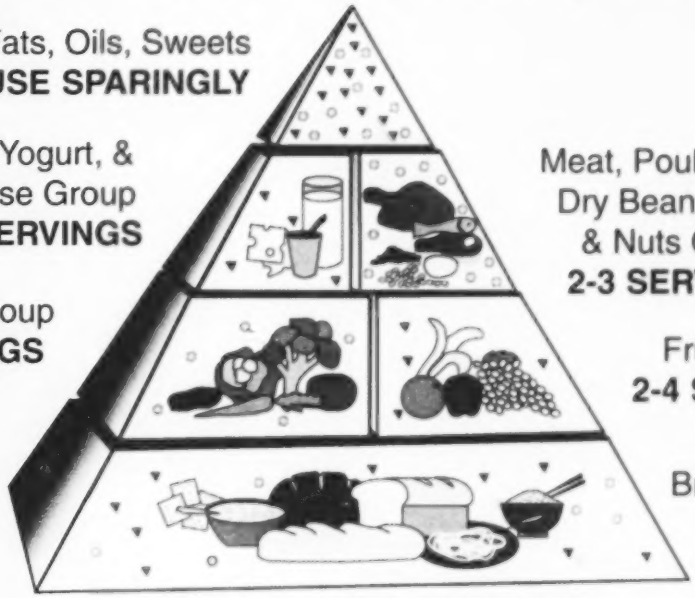
Related Activities:

1. Write to Pacific Coast Canned Pear Service, P.O. Box 7111, San Francisco, CA 94120 and request a Great Pear-A-Mid Poster and Great Pear-A-Mid story for the classroom.
2. Write to Snack Almanac, National Dairy Council, Rosamont, IL 60018-5616 and request a snack almanac for the classroom.

To be used with:
Build a Pyramid Diet

Name: _____

USDA Food Pyramid vs. Actual Consumption



Fats, Oils, Sweets
USE SPARINGLY

Milk, Yogurt, & Cheese Group
2-3 SERVINGS

Vegetable Group
3-5 SERVINGS

Meat, Poultry, Fish, Dry Beans, Eggs & Nuts Group
2-3 SERVINGS

Fruit Group
2-4 SERVINGS

Bread, Pasta, Rice & Cereal Group
6-11 SERVINGS

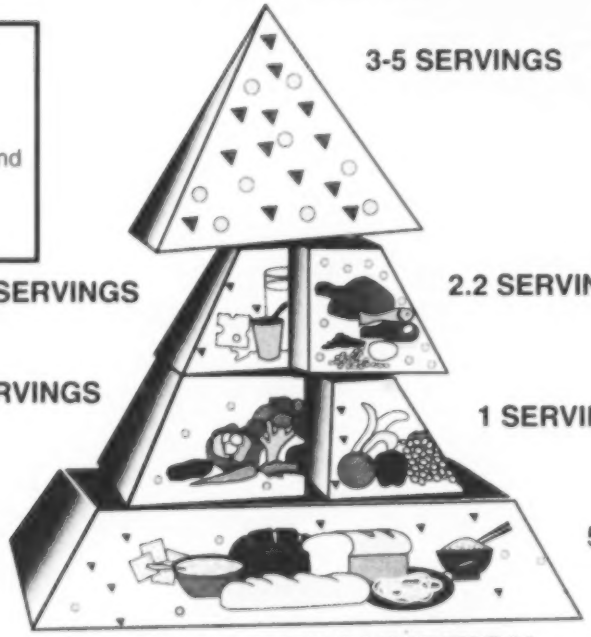
USDA FOOD PYRAMID

KEY

These symbols show fat and added sugars in foods

○ = FAT (naturally occuring and added)

▼ = SUGARS (added)



3-5 SERVINGS

1.3 SERVINGS

2.2 SERVINGS

2 SERVINGS

1 SERVINGS

5.1 SERVINGS

ACTUAL CONSUMPTION

Adapted from Farm and Food Facts 1999 Illinois Farm Bureau®

To be used with:
Build a Pyramid Diet

Name: _____

What I Eat

All of the foods we eat belong to one of six food groups. It is important to eat foods from each group every day in order to have a balanced diet and to give our bodies the proper vitamins and minerals.

Write down everything that you eat or drink in one day. (Don't forget snacks!) Then list each food under the proper food group. The suggested servings for each food group can be found in parenthesis. Compare what you eat for a day to what you should eat.

Some foods will be listed under more than one group. For example: a cheeseburger would belong under "meat" and "dairy." The bun would go under "bread." If it had pickles and onions, they would go in the "vegetables" column.

Foods I ate on: _____ **(date)**

Breakfast	Lunch	Dinner	Snacks
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Foods I Ate From Each Food Group

Meats, Poultry, Fish, Eggs, Nuts, Dry Beans (2-3 Servings)	Milk, Yogurt, & Cheese (2-3 Servings)	Bread, Cereal, Rice, & Pasta (6-11 Servings)	Fruits (2-4 Servings)	Vegetables (3-5 Servings)	Fats, Oils, & Sweets (Use Sparingly)

Is Your Water Safe?

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Teach and observe microorganisms existing in water samples.
2. Teach students to exhibit caution for their own health and safety in using and consuming unknown sources of water.

Students:

1. Develop an awareness of acceptable microorganisms in water.
2. Learn appropriate checks for water safety for general use and consumption.

Illinois Learning Standards: 22.A.1b; 22.A.1c; 22.C.1

Introduction:

Water is a very important resource in our lives. Water is in every living thing. Without water we would not be able to live. We wouldn't be able to grow food, clean things, or do many other things. Our body is about 65 percent water, an ear of corn is about 70 percent water, a potato is about 80 percent water, and a tomato is about 95 percent water. In order for living things to carry out life processes, we must keep our water supply near normal. We can live without food for about two months, but we cannot live without water for more than one week.

Water covers more than 70 percent of the earth's surface. Water is in the oceans, rivers, lakes, in the ground, and the air we breathe. Water helps to keep the earth's climate from being too hot or too cold. The land quickly absorbs and releases heat from the sun. But the oceans absorb and release the sun's heat slowly. This causes the ocean breezes to bring coolness to the land in the summer and warmth in the winter.

Although 70 percent of the earth is water, about 97 percent of this water is in the oceans. The water in the oceans is too salty for drinking, manufacturing, and farming. The fresh water is about 3 percent of the water supply. Then three-fourths of the three percent is unobtainable because it is in icecaps and other glaciers.

The movement of water in and around the earth is called the hydrologic cycle. The hydrologic cycle is a continuous cycle. Rain or snow falls on oceans and land as precipitation. The soil will soak up some of the water. Plants will take up some of the water through their

roots, and some water will move down through the soil and become groundwater. Water from the rain and snow will run off the land into streams, marshes, lakes, and oceans. The water that remains on the earth's surface is called surface water. Surface water will return to the atmosphere through evaporation. Then water vapor may form clouds that cause precipitation (rain or snow) to occur again. The precipitation will return to the surface of the earth.

This activity is designed for familiarizing students with good and bad microorganisms present in our water supply. The activity begins by developing a learning center where students can observe drinking water through a microscope and observe a pond water sample through a microscope. Thus, the student can readily observe why one is appropriate for drinking and the other is not. The experiment conducted during this activity further educates students concerning water which appears clear and the hidden dangers which could exist in it if the water is not clearly labeled safe.

In this activity, sugar is dissolved in the water so even if a student accepts the unknown challenge, there is no danger present. However, enough is unknown to the student to arouse caution from the group and make a significant impact on the group that it would be unsafe to make assumptions about truly unknown, seemingly clear, sources of water for consumption and other uses.

Materials Needed:

- 2 classroom microscopes
- 2 microscope slides
- 2 cover slips for slides
- 1 tap water sample
- 1 pond water sample
- 2 gallon jars (may be available from the cafeteria) filled with tap water
- 1 large mailing envelope containing 1/4 cup sugar
- 1 mixing spoon

Activity Outline:

1. Learning Center Setup: Prepare a learning center as activity commences. Available at the learning center are two microscopes. First set up the microscope with a few drops of tap water on a slide. Set the jar containing the tap water sample nearby and clearly label it. Set up the second microscope with a few drops of pond water on a slide. The jar containing pond water will be on hand for observation by the students near microscope two's setup.
2. Students come in pairs, view both water samples, and return to their seats until the entire class has had an opportunity at the center. The teacher explains the difference in the two sources of water and the precautions cities and towns take to make the water safe for users.

3. The teacher has available two one-gallon jars full of tap water for students to view. To demonstrate all water that appears safe may not be safe, the teacher begins by telling the children she or he has two jars of tap water and asks the class to evaluate the safeness of using this water for all types of purposes. Students should agree it's safe.
4. Using two student volunteers, the teacher asks the first student to pour the contents of the mystery envelope into one jar of water and has the second student stir until completely dissolved and invisible.
5. The teacher asks again which water is safe, and students should agree that the water with no additive is safe.
6. As students hide their eyes from view, the teacher mixes up the jars (places each jar in a new spot).
7. The teacher then asks the students which water is safe. The conclusion should be that the water would need testing and that both water samples are presumed unsafe until it could be proven safe again. Also, the students should conclude not all unsafe water will appear unsafe, because not all harmful substances can be seen by the eye alone.
8. Discuss the reasons why we should take precautions to keep our water safe. What ways can we make sure our water is safe?

Discussion Questions:

1. How many of you would take a drink from the first jar? The second jar?
2. Would you feel safe drinking clear water from an unknown source after seeing this experiment?
3. When visiting a different city or town in the USA, could you assume the water is safe for drinking?
4. Can you assume all cities in the world have safe water for your body?

Related Activities:

1. Take a vote of how many students in class would take a drink of each jar of water. Make a bar graph showing the yes and no responses for each jar.
2. Ask a local water department official to come in and speak to the class about the processes used to keep the water safe in the city/town. Have the official share with the students how he/she gained his/her expertise and education used in his/her job.
3. Take the pond water to the local water department and ask that it be analyzed and harmful substances listed. Share the finding with the class.

Groups of Three - Let Them Be

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

Provide background information on poisonous plants and their effects on people.

Students:

1. Learn to distinguish common poisonous plants from others.
2. Avoid the results of contact with poisonous plants.

Illinois Learning Standards: 22.A.1a; 22.A.1b; 22.A.1c; 22.C.1

Introduction:

Some plants provide us food and clothing. However there are plants that can harm us. Poisonous plants can be found in Illinois and can be hazardous if not properly treated. Poison ivy and poison oak are two such plants. Poison ivy can be a vine along the ground, a vine climbing on low plants, tall trees, or a woody shrub. Each stem has three leaflets. Poison oak is a woody shrub, and each stem has three leaflets. The adage "Leaves of three; let it be," applies to both plants.

Some plants are poisonous by touch and some are poisonous by ingestion. If you have been exposed to these plants, your skin should be washed within 10 minutes of exposure. Don't scratch the red bumps, because when you do the poison is spread. Apply cool, wet compresses, calamine lotion, cortisone cream, or a paste of baking soda and water to relieve the itch. The rash will become less painful and generally is gone within three weeks.

Use photos, literature, and a visual experiment so that students will be able to identify and clearly assess the difficulties incurred when contact is made with a poisonous plant by the skin.

Some poisonous plants include philodendron, jack-in-the-pulpit, castor bean, daffodil, narcissus, wild black cherry, milkweed, pokeweed, painted daisy, monkshood, rhododendron, iris, and others. Do not eat or touch any plant unless you are 100 percent sure it is safe because plants with more or less leaves than three may also be dangerous.

Materials Needed:

- *Poison In Our Path* by Anne Ophelia Dowden (optional)
- An exhibit of poisonous plants (pictures)
- A large washable doll (male, female, or both) attired in washable clothing
- Squeezeable ketchup
- Cotton swabs

Activity Outline:

1. Display or allow children to closely observe pictures of very commonly known poisonous plants. Particularly focus on the groups of three leaves on stems of the poison ivy plant. Children will be able to identify the groups of three leaves of the poison ivy plant and the jagged edges of its leaves. If you would like, read the book *Poison In Our Path*, by Anne Ophelia Dowden.
2. Allow children to place four or five drops of ketchup on the doll as it sits on a table or chair. The drops can be placed anywhere on the doll that the hands and arms of the doll can be stretched to reach.
3. Allow each child to come forward, and using the cotton swabs, scratch the ketchup drops, which symbolize the point of skin contact with poisonous plant, and touch one other place on the doll "scratching the itchy spot." The child then returns to his/her seat.
4. After numerous contacts by the children, the class can actually see "poison" spreading by contacting other parts of the body following "scratching" to relieve the "itching." Students will understand from this activity that the accidental contact may not be able to be avoided, but the spread of the poison by scratching and itching can be avoided to control the spread of the irritation.

Discussion Questions:

1. What arrangement of leaves are to be especially avoided in outdoor areas?
2. If you feel you have contacted a poisonous plant with your skin, what can you do to control the spread of the itching?
3. Does poison ivy only pose a threat to people in a wooded area?

Related Activities:

1. Invite the local poison control center to speak to the class about poisonous indoor and outdoor plants.
2. Call on the county extension specialists to come to class to discuss and share information on known local locations of poison ivy and other poisonous plants.

Other Resources:

1. The Illinois Department of Natural Resources has learning packets to teach students about natural resources, wildlife, trees, forests, ecological concepts, aquatic wildlife, and conservation. Contact the Illinois Department of Natural Resources, Division of Education, 524 S. Second Street, Springfield, IL 62701, ph. (217) 524-4126.
2. Check out the Illinois Department of Natural Resources Website at http://dnr.state.il.us to find more information and how to get educational materials for your classroom.

Boy Oh Boy...Look At Soy!

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Help students realize how they use soybean products every day and that agriculture is important to our lives.
2. Explain how soybeans are nutritionally valuable and assist students in making ginger cookies.

Students:

1. Understand the value of soybeans.
2. Demonstrate understanding of the importance of protein, carbohydrates, vitamins, minerals, and dietary fiber by explaining how cookies made with soybeans are useful to our bodies.
3. Name the parts of soybeans and soybean plants and how they help the soybeans grow.

Illinois Learning Standards: 12.A.1a; 12.B.1a; 12.B.1b; 13.B.1d; 22.A.1b; 22.B.1

Introduction:

More soybeans are grown in the United States than anywhere else in the world. In 1998, Illinois farmers grew 469,000,000 bushels of soybeans. That was 17 percent of the total soybeans grown in the U.S. Illinois ranks second in soybean production among other states. About 10,700,000 acres of Illinois land are used for soybean growth.

Soybeans are the most widely eaten plant in the world! They contain protein, carbohydrates, vitamins, minerals, and oil. Soybeans are high in dietary fiber and supply all of the amino acids (protein) needed for human health. Soy protein foods reduce cholesterol and may cut heart disease risk by 25-30 percent if eaten regularly. Soy may also cut the risk of osteoporosis and fractures in later years of life by increasing bone density. Soy products may also fight cancer through a unique chemical called genistein which suppresses the growth of cancer cells. Soybeans are fed to livestock, so often humans eat soybeans indirectly.

In processing, the soybeans are cleaned, cracked, dehulled, and rolled into flakes. This

ruptures the oil cells for efficient extraction. After removal of the soybean oil, the remaining flakes can be processed into various edible soy protein products or used to produce protein meal for animal feeds.

The dry, solid portion of the bean provides many edible products. Soy flours and grits are used in the commercial baking industry. Soy flour is the fine powder produced by grinding soybeans. Look for soy flour at health food stores. Soy hulls are processed into fiber-bran breads, cereal, and snacks. Soybean oil finds its way into such products as margarine, salad, and cooking oils.

Each year's soybean crop develops from soybean seed. The seed contains a seedling (young plant) and food for it. The main parts of the soybean seed are:

Hilum—the part of the seed where it was once attached to the pod. The hilum is often black or brown but is yellow on some varieties.

Seed Coat—a thin covering that protects the seed.

Cotyledon—the part of the seed in which food for the seedling is stored. Each bean has a pair of cotyledons forming a protective shield around the seedling.

Epicotyl—the uppermost part of the seedling. It has two leaves that are unifoliated (containing only one leaflet). These are the first true leaves to develop on the plant.

Hypocotyl—the lower portion of the seedling's stem.

Radicle—the main root of the seedling. It takes up water and nutrients from the soil to nourish the seedling.

Materials Needed:

- "Soybean Machinery" handout
- 3/4 cup margarine
- 1 cup brown sugar
- 1 egg
- 1/4 cup molasses
- 3 tablespoons milk
- 2 1/4 cups soy flour
- 2 teaspoons baking powder
- 1 teaspoon cinnamon
- 1 1/4 teaspoon ginger
- 1/2 teaspoon cloves
- 1/2 teaspoon salt
- Granulated sugar for tops

Activity Outline:

1. Discuss soybean production in Illinois and the uses of soybeans.
2. Discuss the machines used to produce soybeans using the "Soybean Machinery" handout.
3. Discuss the nutritional benefits of soybeans to our bodies.
4. Look at soybeans and soybean plants. Ask the students to name the parts and what they do for the soybean plant.
5. Make ginger cookies with your class. (see materials list)
   a. Mix the margarine, brown sugar, egg, molasses, and milk.
   b. Blend in remaining ingredients.
   c. Drop by teaspoon on lightly oiled baking sheet.
   d. Bake at 350° for 12 minutes or until just set. Don't overbake.
   e. Sprinkle each cookie with granulated sugar.
   f. Remove from baking sheet, makes about four dozen cookies.
   g. Eat the cookies after the students name the ways the soy ginger cookies are helpful nutritionally.

Discussion Questions:

1. What are some uses for soybeans?
2. What are the parts of a soybean?
3. What nutritional value do soybeans have?

Related Activities:

1. Use *Ag Mag* 10, "Imagine a Bean . . .It's the Coolest Thing," from Illinois Farm Bureau® to make crayons from soybeans.
2. Grow soybeans in your classroom. Talk about the parts of a soybean plant and how they grow. Chart the plant growth.
3. Make soynuts using the instructions in *Ag Mag* 10, "Imagine a Bean . . .It's the Coolest Thing."
4. Study George Washington Carver, who discovered that soybeans have valuable protein and invented many uses for them.
5. Use soybean plants to study root growth, transpiration, evaporation, and light.

Other Resources:

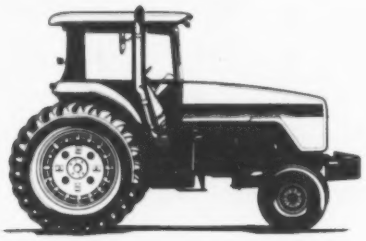
1. *Ag Mag* 10, "Imagine a Bean . . .It's the Coolest Thing," an educational magazine for classrooms, contact your county Farm Bureau® for information about using free Ag Mags in your classroom.
2. "Soybeans: The Miracle Crop" kit for grades 4-6, Illinois Soybean Association, Illinois Soybean Checkoff Board, 1605 Commerce Parkway, Bloomington, IL 61704, (309) 663-SOYA.
3. The Indiana Soybean Kit, available for loan from many county Farm Bureaus®.
4. "The Soybean Solution," Nebraska Soybean Association, 301 Centennial Mall So., Fourth Floor, Box 95144, Lincoln, NE 68509.
5. "Captain Soybean and his Protein Potent Pals Wonder Book," Illinois Soybean Association, Illinois Soybean Checkoff Board, 1605 Commerce Parkway, Bloomington, IL 61704, (309) 663-SOYA.
6. "The Miracle Crop . . .SOYBEANS," A brochure from the Illinois Soybean Association and the Illinois Soybean Checkoff Board, 1605 Commerce Parkway, Bloomington, IL 61704, (309) 663-SOYA.
7. *Why the Brown Bean was Blue* by Susan M. Pankey, Nebraska Ag in the Classroom, 5225 S. 16th St., Lincoln, NE 68512, (402) 421-4400.
8. "Where's Bennie?" Coloring Book, Indiana Soybean Development Council, 423 West South Street, Lebanon, Indiana, 46052, (317) 482-4376.

9. Ag in the Classroom Video/Lesson Plans on Soybeans featuring "Sandy Soybean," North Carolina Farm Bureau & North Carolina Soybean Producers Association, P. O. Box 27755, Raleigh, NC 27611, (919) 783-4326 or (919) 782-1705.
10. "Soy McCoy Coloring Book," Ohio Soybean Council, P. O. Box 479, Columbus, Ohio 43216.
11. The Magic Bean: A Look at the Versatile Soybean," "Look Where Soybeans Go," brochures from Archer Daniels Midland Company, Box 1470, Decatur, Illinois 62525, (217) 424-5200, http://www.admworld.com.
12. "1995 Soy Stats," reference guide, American Soybean Association, P. O. Box 419200, St. Louis, MO 63141-9200, (314) 576-1770.
13. Illinois Soybean Association, Illinois Soybean Checkoff Board: www.ilsoy.org/.
14. American Soybean Association: www.oilseeds.org/asa/.
15. Soybean Statistics: www.ag.uiuc.edu/~stratsoy/96soystats/pg2.html.

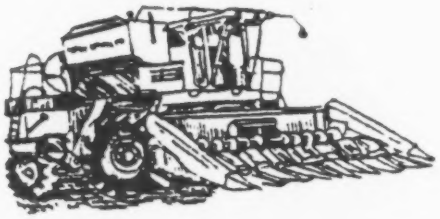
To be used with:
Boy Oh Boy, Look at Soy!

Name: _____

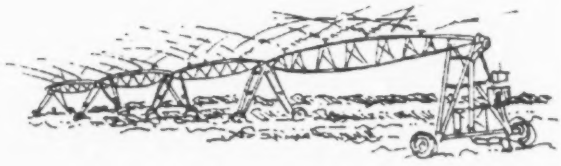
Soybean Machinery



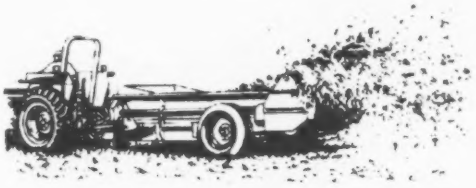
Tractor



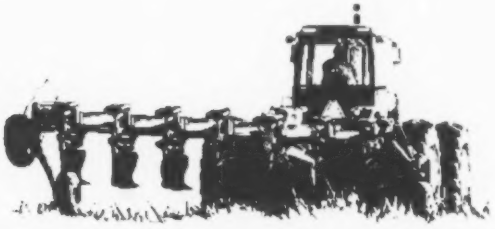
Combine



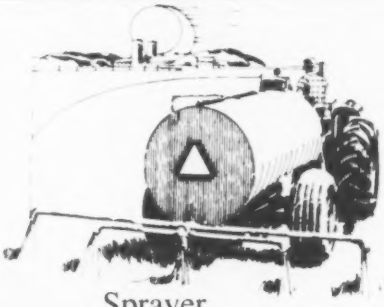
Irrigation System



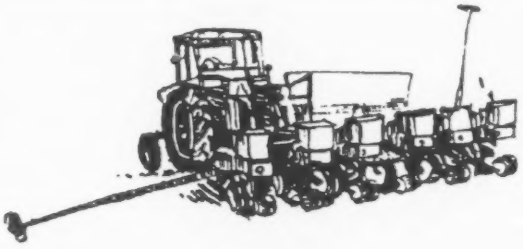
Spreader



Plow



Sprayer



Planter

Make Your Own Feed Sack

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Teach students about hog production and the nutritional value of pork to our bodies.
2. Relate hog production to the students' lives by showing them how to make a feed sack with human food to represent a feed sack for hogs.
3. Design realistic market situations to help students learn about making a profit.

Students:

1. Describe how hogs are raised.
2. Explain the nutritional value of pork and how it assists our bodies.
3. Assemble a feed sack after learning about what hogs eat.
4. Compute the market price for hogs.

Illinois Learning Standards: 4.A.1c; 4.B.1b; 6.A.1a; 23.B.1

Introduction:

The hog was among the first animals to be domesticated. Hernando DeSoto, an explorer, brought the first hogs to America in 1539. Today, hogs are raised across the United States, employing an estimated 600,000 people.

Producers raise hogs today that weigh more, grow more efficiently, and yield more lean meat than ever before. Bacon, pork sausage, pork chops, and ham all come from hogs, but there are about 500 different by-products of hogs as well. Some examples are fertilizers, glass, china, floor wax, chalk, and crayons.

Sows give birth to litters of piglets twice a year. Each litter usually has seven to 10 piglets. Giving birth to piglets is also called farrowing. Some pork producers have "farrow to finish" farms, which means the pigs are bred, born, and fed on the farm until they are taken to market. Pigs are weaned when they are two to four weeks old. Until a pig reaches 120 pounds, it is known as a pig. When a pig weighs more than 120 pounds, it is called a hog. Hogs are usually taken to market when they weigh 240-260 pounds.

Pigs/hogs are fed a balanced diet so they grow healthy and strong to provide good food for us. In Illinois we feed corn, soybean meal, vitamins, and minerals to pigs/hogs. Additives are also added to pig and hog feed to provide minerals and vitamins for the animals. This helps to increase growth and improve health.

Hogs are very much like humans because their heart and other organs work the same way. That is why doctors can use a hog's heart valve in a human when the human's valve wears out. Pigskin can also be used to treat people who have been badly burned. If certain medication helps pigs/hogs, then chances are it will also help humans.

Caring properly for pigs/hogs is a big job and has great economic impact upon the producer. Quality livestock is very important in producing valuable products. Because of changes in consumer demands, farmers practice careful breeding practices to genetically improve livestock products.

Pork producers must calculate their costs accurately, making sure that they are producing high quality products at a reasonable cost. Farmers, as well as other business people must make a profit on their products in order to make a living for their families. The reason that research and development is so important to the hog industry is to find new product uses to increase economic opportunities.

Pork in our diet is important because it has high amounts of protein, B-vitamins, and thiamin. In fact, pork has three times as much thiamin as any other food. Thiamin changes carbohydrates into energy and promotes a normal appetite.

Materials Needed:

- "Get the Pig Picture" worksheet
- "Hog Feed Labels" sheet
- **Welcome to Our Farm* by National Pork Producers Council
- Blue jellybeans
- Candy corn
- Ground peanuts
- M & M's
- Raisins
- Puffed wheat cereal
- Resealable plastic bags
- Yarn or string (22" pieces – one per student)

Activity Outline:

1. Discuss hog production with your class. *You may want to read *Welcome to Our Farm* from the National Pork Producers Council, P. O. Box 10383, Des Moines, IA 50305, 1-800-456-7675 or (515)223-2600, FAX (515)223-2646, http://www.nppc.org/ (cost is 50 cents each).
2. Discuss the nutritional value of pork. What category is pork in on the Food Guide Pyramid? How many daily servings are recommended from this group?

3. Discuss what pigs/hogs eat from the information provided in the introduction.
4. Help the students make their own "Hog Feed Sacks." Give each student a piece of string/yarn, a resealable plastic bag, and a copy of a "Hog Feed Label." Have the students punch holes in the top left and right corners of their plastic bag. String one end of string/yarn through the left hole and tie, then string the other end of the string/yarn through the right hole and tie. Now the students have made a feed bag.
5. After the students study and discuss the "Hog Feed Label," they should put the jellybeans, candy corn, ground peanuts, raisins, M & M's, and puffed wheat into their feed bags to represent the diet of hogs. They can eat their goodies as a snack or save them for later.
   ** Teacher's Note: You can either write the "Hog Feed Label" on the board or you can copy the "Hog Feed Labels" sheet, cut them on the dotted line, and have the students place them in their feed bag. (The label and picture of the pig can be folded in half to fit in the bag.)
6. Read the following paragraph and answer the following questions as a class:
   Mr. Wilkinson raises pigs and takes them to market to sell them whenever they reach the market weight of at least 250 pounds each. Mr. Wilkinson knows that if he feeds his pigs a balanced diet they will grow strong and healthy. If he feeds his pigs an unbalanced diet that does not include all of the pigs' nutritional needs, then the pigs will not be as strong and healthy. The balanced diet will help the pigs to grow lean and muscular. The unbalanced diet will cause the pig to grow slower.
   a. Mr. Wilkinson feeds one pig a balanced diet and one pig an unbalanced diet. The pig with a balanced diet grows to weigh 256 pounds. The pig with the unbalanced diet grows to weigh 225 pounds. Which pig weighs more?

Discussion Questions:

1. How do farmers care for pigs?
2. What is the nutritional value of pork to our bodies?
3. What do pigs eat?
4. Do pigs grow better when they are fed a well-balanced diet or an unbalanced diet?
5. How are pigs helpful to humans?

Related Activities:

Swine "Site"-ings: Ask students to research various hog Web Sites or books and make a list of the similarities between hogs and humans. Do they have the same temperature, heart rate, and respiration rate? Think of some other comparisons too! Here are some sites to check out:
National Pork Producers Council: http://www.nppc.org/
North Carolina State University's Extension Swine Husbandry: http://mark.asci.ncsu.edu/
The Electronic Zoo: http://netvet.wustl.edu/pigs.htm

Other Resources:

1. "The World of Pigs," teaching activities for K-8 classrooms---Illinois Pork Producers Association, 6411 South Sixth Street Road, Springfield, IL 62707-8642, (217)529-3100.
2. "Pig Tales," Preschool-1st grade activity newsletter, National Pork Producers Council, P. O. Box 10383, 1776 N.W. 114th St., Des Moines, IA 50306, 1-800-456-7675. One free per educator, then 10 cents each.
3. "Pig Talk," A brochure from the Minnesota Pork Producers Association, 360 Pierce Plaza, Suite 106, North Mankato, MN 56003, (507)345-8814.
4. "Facts about Pork," Pork information and recipes from the Pork Industry Group of the Meat Board, 444 North Michigan Avenue, Chicago, IL 60611.
5. "Pigtionary," A dictionary of pig-related terms from the Minnesota Pork Producers Association, 360 Pierce Ave. #106, North Mankato, MN 56003.
6. "Learning About Pork," an activity book from the National Pork Producers Council, P. O. Box 10383, 1776 N.W. 114th St., Des Moines, Iowa 50306, 1-800-456-7675. 10 cents each.

To be used with:
Make Your Own Feed Sack

Name: _____

Get the "Pig" Picture

Directions: Write names of products that come from pigs in the appropriate category.

Food

_____

_____

_____

_____

Clothing

_____

_____

_____

_____

Health Needs

_____

_____

_____

_____

Household

_____

_____

_____

_____

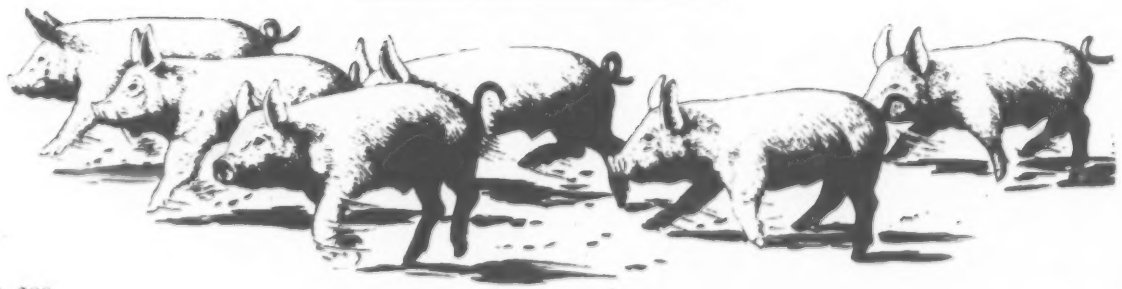
Other

_____

_____

_____

_____

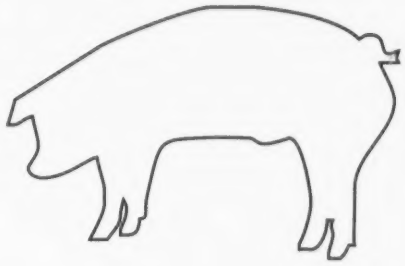


To be used with:
Make Your Own Feed Sack

Hog Feed Labels

HOG FEED LABEL

Hogs Need:	Represented by:
Water	Blueberry Jellybeans
Carbohydrates	Candy Corn
Protein	Ground Peanuts
Minerals	Raisins
Vitamins	M & M's
Carbohydrates	Puffed Wheat



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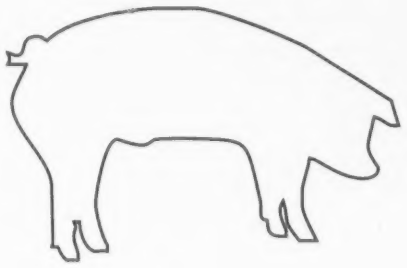

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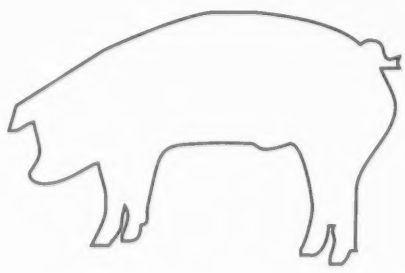

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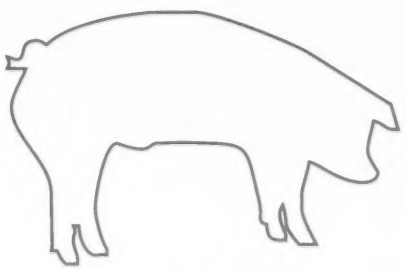


"Venn"—ting on Veterinarians

Grade Level: K-3

Approximate Length of Activity: 15 minutes

Objectives:

Teacher:

1. Help students explore the facets of a medical career involving agriculture.
2. Analyze and compare the similarities and differences of two related topics, veterinarians and medical doctors.

Students:

1. Discover how the careers of a veterinarian and a medical doctor are alike.
2. Discover how the careers of a veterinarian and a medical doctor are different.

Illinois Learning Standards: 10.A.1b; 23.B.1

Introduction:

Veterinarians are animal doctors. Veterinarians know how to treat, prevent, and diagnose animals concerning health problems. They examine and treat sick and injured animals and perform routine health checks. Veterinarians are very important to farmers. Veterinarians can help farmers know when something is wrong with their animal and help the farmer keep the animal healthy. Farmers could need a veterinarian at any time, day or night, so many veterinarians provide services outside of the normal workday. For a person to become a veterinarian, they have to go through many years of college and study anatomy, physiology, microbiology, pathology, and surgery.

A Venn diagram is used for noting similarities and differences when comparing two topics. See the example in this lesson comparing a medical doctor and a veterinarian. There are many similarities and differences between the careers of a veterinarian and a medical doctor. Some of the similarities are: promoting good health, promoting good nutrition, diagnosing illnesses, performing surgery, prescribing medication, giving advice to keep patients in top condition, keeping office hours, and being on call for emergencies. Some of the differences are: veterinarians work with animals, they make "house calls" for larger animals, they have different equipment and different medications for their patients, and they go to different medical schools for training. Medical doctors help people and they see most of their patients in offices or hospitals.

Materials Needed:

- "Venn Diagram" on Veterinarians and Medical Doctors
- Overhead projecter or chalkboard
- Marker or chalk

Activity Outline:

1. Introduce the lesson by explaining that a Venn diagram helps to point out the similarities and differences when comparing two topics. Start a Venn diagram on the overhead projector or chalkboard. (Use the included "Venn diagram" for help.)
2. Discuss the tasks of a medical doctor with the class.
3. Next discuss the tasks of a veterinarian.
4. Ask how the two careers are similar. Fill in the intersecting part of the circles.
5. Ask how the careers are different. Fill in the circles under the appropriate headings.
6. Review the class' completed Venn diagram.

Discussion Questions:

1. How are the two careers the same?
2. How are the two careers different?
3. What would you like/not like about being a veterinarian?
4. What would you like/not like about being a medical doctor?
5. What did you learn about a medical doctor?
6. What did you learn about a veterinarian?

Related Activities:

1. Make a class book. Give each child a 9" x 12" piece of paper. Have each child write, "If I were a veterinarian, I would like _____, but I would not like _____. After the students illustrate their own page, compile the pages into a class book.
2. Ask the students to write down the jobs of their family members (mother, father, grandparents, aunt, and uncle). Make a career graph using the information. Point out the ones involving agriculture. (Agriculture involves nearly one out of five jobs.)
3. Invite a veterinarian to come to the classroom and discuss his career.
4. Discuss the care and safety of working with animals. Write and/or discuss "I would like _____ for a pet, but I would not like _____ for a pet!

To be used with:
"Venn"-ting on Veterinarians

WS-234

Name: _____

Venn Diagram

Medical Doctor

Different

Patients are people

Equipment is geared for human use

Has verbal communication with patients

Has medical training for humans

Alike

Prescribe medication

Perform surgery

On call for emergencies

Promote good health

Veterinarian

Different

Patients are animals

Equipment is geared for animal use

Has no verbal communication (dialogue) with patients

Has veterinarian medical training

Vegetable Twister

Grade Level: K-3

Approximate Length of Activity: One class period

Objectives:

Teacher:

1. Emphasize the importance of vegetables to our bodies.
2. Guide students in a game which teaches them about vegetable production.

Students:

1. Learn how vegetables are produced.
2. Learn how vegetables help our bodies.
3. Match vegetables to the plant parts they come from.
4. Name vegetables grown in Illinois.

Illinois State Goals for Learning: 12.A.1b, 13.B.1d, 22.A.1b, 23.B.1

Introduction:

Although definitions of vegetables vary, the definition used by horticulturists is that they are foods that grow on herbaceous plants, or plants that have stems that are softer and less fibrous than the woody stems of trees and shrubs. Vegetables are the bulbs (onions), flower buds (cauliflower), fruits (pumpkins), leaves (cabbage), roots (carrots), seeds (peas), stems (asparagus), or tubers (potatoes) of herbaceous plants. Vegetables such as tomatoes, sweet corn, and potatoes are grown in Illinois.

There are four steps in vegetable production: planting, caring for the crop, harvesting, and packing and shipping. Some vegetable growers have small gardens while others have large vegetable farms. A vegetable grower takes care of his or her crop by preparing the soil, fertilizing the field, cultivating the soil (tilling), and killing harmful weeds and pests. After harvest, the vegetables are shipped to processing plants, sent to markets, or eaten in the home.

Vegetables are a good source of carbohydrates, vitamin A, vitamin C, fiber, and potassium. Carbohydrates are the main source of energy for the red blood cells and the central nervous system. Carbohydrates are found in many vegetables, but are high in potatoes, corn, and peas. Vitamin A helps the body fight infections and gives us healthy skin and eyes. High

amounts of vitamin A are found in carrots, squash, and spinach. Vitamin C helps the body fight infections and heal wounds and bones. It can be found in broccoli, spinach, and green peppers. Vegetables are a good source of fiber, which helps the digestive system, and potassium, which regulates blood pressure and helps nutrients pass into cells.

Vitamins such as vitamin C and A are necessary for the growth of body tissue. If a person eats a balanced diet, he/she will intake adequate vitamins. Vitamin deficiencies can impair physical performance, but there is no evidence that taking extra vitamins (more than the daily requirement) will enhance performance. Sometimes vitamin supplements are taken when a person does not eat enough vitamin-rich foods. Large doses of vitamin supplements can be dangerous to the body tissue. They can also be a waste of money because some vitamins go right through the body and are not used if there is an excess.

In the following activity, students will be tested on their knowledge of vegetable plant parts through a fun game of twister.

Materials Needed:

- Old bed sheets
- Soy crayons/markers
- Cardboard
- Paper clips/metal fasteners

Activity Outline:

1. Use an old bed sheet (or several sewn together) to create a vegetable twister board. Make a grid on the sheet and let students use soy crayons or markers to draw vegetables. The vegetables should have equal representation from the different plant parts. (bulbs, flower buds, fruits, leaves, roots, seeds, stems, or tubers)
2. Make two spinners out of cardboard and paper clips or metal fasteners. One spinner should be a circle split into four sections: right hand, right foot, left hand, and left foot. The other spinner should be separated into eight sections: bulbs, flower buds, fruits, leaves, roots, seeds, stems, and tubers. (It may be easier to create two vegetable twister boards; each can use four plant parts instead of eight.)
3. Two students can spin the spinners. Only one student moves at a time on the vegetable board. If the two spinners are spun for the first player and the combination is right hand and tuber, the student must place his right hand on a tuber. (such as a potato) The second player is spun for next and also places his hand/foot on the proper vegetable for the plant part that is called. The game continues as the spinners spin for the players in order. Vegetable twister becomes a challenge as it is hard to share vegetables and maneuver. The game continues until one player places his hand/foot in the wrong place or falls down. The last student "planted" on the board wins!
4. To relate this to sports/health, ask children which muscles started to hurt while they were waiting to move their hands and feet. Discuss the names of those muscles and how they help us move.

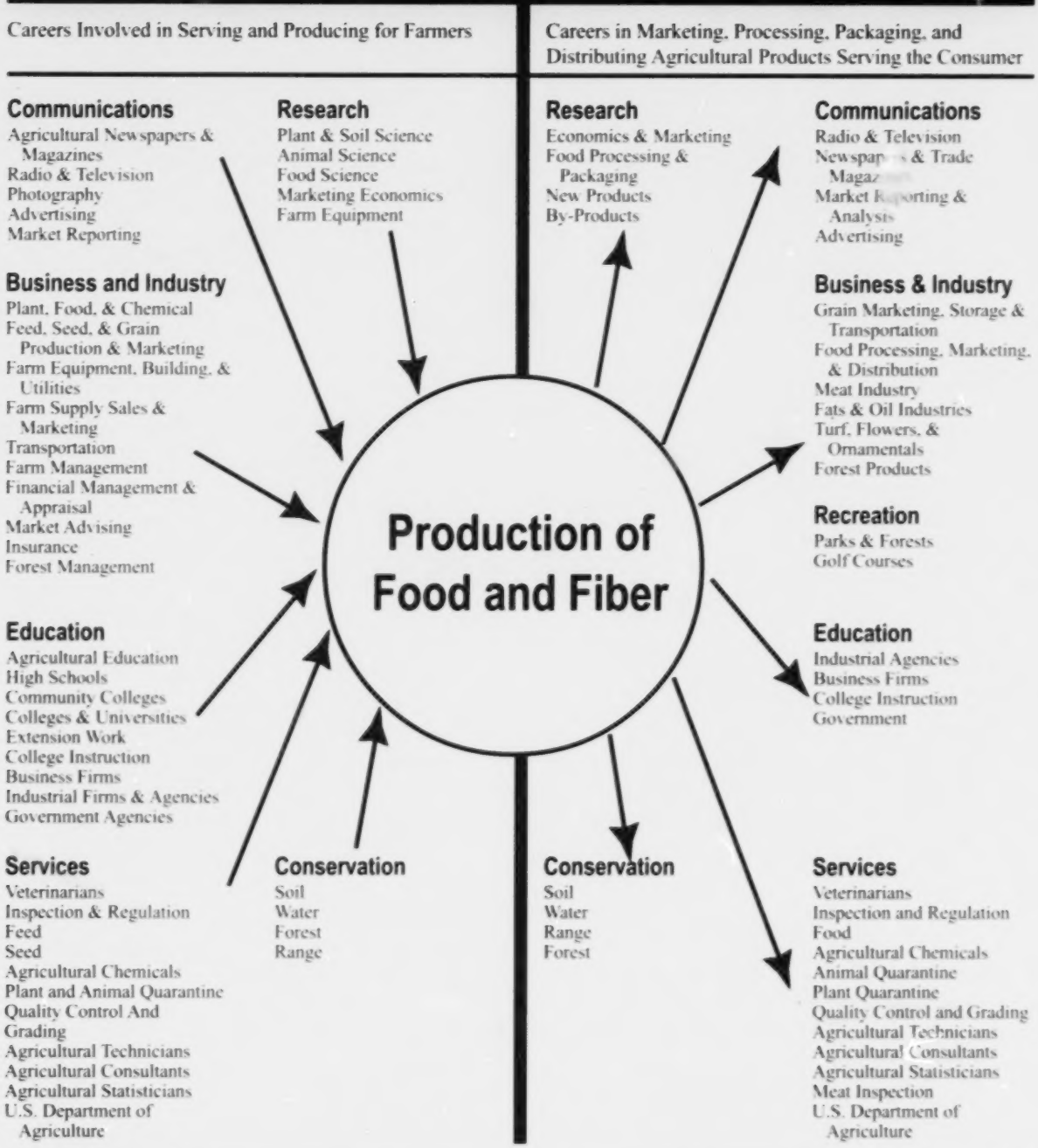
Discussion Questions:

1. How are vegetables produced?
2. How do vegetables help our bodies?
3. Name the parts of plants that vegetables come from.
4. Name three vegetables that are grown in Illinois.

Related Activities:

1. Make vegetable soup using different vegetables.
2. Make art projects using vegetables.
3. Make stamps with potatoes.
4. Make celery wagons: Cut celery in two-inch sticks and attach four carrot slices for wheels with toothpicks.

Career Opportunities in Food and American Agriculture



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Careers in Agriculture

Agricultural and Consumer Economics

Agricultural Economics

Job Titles
Commodity broker
Credit examiner
Farm and land appraiser
Food store manager
Marketing advisor
Professional farm manager
Sales representative
Marketing services

Prospective Employers
Accounting firms
Chemical companies
Commercial bank institutions
Federal agencies
Food manufacturers
Grain companies
Insurance companies

Employer Examples
Cargill, Inc.
Chicago Board of Trade
Continental Grain
Dow Elanco
Farm Credit Services
Illinois Farm Bureau
Marine Bank of Springfield
USDA Statistical Reporting Service

Consumer Economics

Job Titles
Claims analyst
Consumer advisor
Consumer services director
Customer assurance
Insurance agencies analyst
Financial counselor
Financial planner
Personnel assistant

Prospective Employers
Brokerage firms
Financial institutions
Government agencies
Law firms

Employer Examples
Better Business Bureau
The Brokers
Extension Service
Commercial National Bank
International Diners Club
Financial Network Investment Corp.

Marketing of Textiles and Apparel

Job Titles
Area sales manager
Assistant product manager
Customer site representative
Financial analyst
Manufacturing representative
Quality assurance inspector
Sales training coordinator
Store manager

Prospective Employers
Direct marketing companies
Retail establishments
Textile, fabric, and apparel manufacturers

Employer Examples
Benetton
Carson Pirie Scott and Co.
I Magnin
Liz Claiborne
Marshall Fields and Co.
Spiegel
Talbots
U. S. Shoe Corp.

Agricultural Engineering

Agricultural Engineering/ Technical Systems Management

Job Titles
Drainage engineer
Environmental engineer
Food engineer
Machine design engineer
Product manager
Technical salesperson
Technical systems manager

Prospective Employers
Building products companies
Farm equipment manufacturers
Food processors
Machinery manufacturers

Employer Examples
Caterpillar
Deere and Co.
Moorman Manufacturing Co.
Morton Buildings
Spraying Systems, Inc.

Animal Sciences

Animal Sciences

Job Titles
Animal health product salesperson
Dairy equipment specialist
Feed salesperson manager
Food meat product development supervisor
Livestock marketing specialist
Livestock production manager
-beef -dairy
-poultry -sheep
-swine
Research and lab technician

Prospective Employers
Animal health firms
Commercial feed lots
Federal agencies
Feed companies
Marketing commission firms
Private research firms
Purebred breed associations
Veterinary suppliers

Employer Examples
Abbot Labs
A.M.P.I.
Cargill, Feed Division
Eli Lilly and Co.
Excel
Illinois and National Pork Producers
Moorman Manufacturing Co.
Purina Mills, Inc.

Crop Sciences

Crop Sciences

Job Titles	Prospective Employers	Employer Examples
Crop production consultant	Precision crop managers	Pioneer Seed Company
Research and laboratory technician	Crop production contractors	Illinois Department of Agriculture
Plant manager	Agricultural services	Crop Protech
Agroecologist	Farm management	Farmland Industries
Chemical research and development personnel	Government agencies	Illinois Foundation Seeds
	Banks	John Deere, Inc.
Land use planner	Universities	FS Cooperatives
Seed technologist	Private consultants	Novartis
Systems specialist		

Food Science and Human Nutrition

Dietetics

Job Titles	Prospective Employers	Employer Examples
Clinical nutrition specialist	Athletic teams	Carle Clinic
Corporate nutritionist	Public health districts	C.H. Health Technologies
Dietitian	Clinics	Hines V.A. Hospital
Exercise physiologist	Fitness centers	Marriott Corporation
Food service manager	Nursing homes	Parkside Sport and Fitness Center
Nutrition educator	Pharmaceutical companies	Sysco Food Services
Wellness coordinator		

Food Industry and Business

Job Titles	Prospective Employers	Employer Examples
Food broker	Food and appliance manufacturers	Backas Communications
Food editor	Food processing corporations	Better Homes and Gardens
Food stylist	Food wholesale brokers	Federated Foods
Production development manager	Ingredient companies	Kraft General Foods
Sales representative	Magazine and book publishers	Meadow Gold
Test kitchen manager	Restaurants and food services	OSI Industries

Food Science

Job Titles	Prospective Employers	Employer Examples
Food chemist	Commercial labs	Dean Foods
Food manufacturing technician	Dairy product companies	General Mills
Food microbiologist	Food processing and manufacturing	Kraft companies
Food product research and development coordinator		The Quaker Oats Company
		Mars, Inc.
Quality assurance technician		
Starch processing companies		

Hospitality Management

Job Titles	Prospective Employers	Employer Examples
Food & beverage director	Hotels	Hyatt Hotels
Assistant manager	Restaurants	Lettuce Entertain You
Account executive	Food distributors	Sysco
Operations manager	Theme parks	Disney World
Club house manager	Country clubs	Aurora Country Club
General manager	Gaming operations	

Human Nutrition

Job Titles	Prospective Employers	Employer Examples
Consumer foods specialist	Equipment companies	Concept Food Brokers
Educator	Food manufacturing firms	Extension Service
Flavor technician	Government agencies	EFNEP
Nutrition coordinator	Medical and dental centers	Gerber Products Co.
Public health nutritionist	Trade and commodity associations	Jenny Craig Weight Loss Centers
Sensory specialist		National Dairy Council
Test kitchen product development		Nutra Sweet
Weight consultant		Proctor and Gamble

Human and Community Development

Agricultural Communications

Job Titles	Prospective Employers	Employer Examples
Agricultural advertising specialist	Advertising agencies	Gibbs and Soell, Inc.
Farm radio-TV broadcaster	Broadcasting companies	Illinois Agri-News
Market news reporter	Newspapers	Pioneer Hi-Bred International
Photographer	Public relations companies	Prairie Farmer
Public relations representative	Publishing companies	WMBD-TV

Agricultural Education

Job Titles	Prospective Employers	Employer Examples
Educational specialist	AgriBusiness firms	Community colleges
Extension educator	Community colleges	Extension Service
Sales representative	Government agencies	Illinois secondary schools
Teacher	Secondary schools	

Human Development and Family Studies

Job Titles	Prospective Employers	Employer Examples
Adoption counselor	Adoption centers	American Academy of Pediatrics
Child life specialist	Child care resource and referral	Big Brother/Big Sister programs
Extension educator	Corporate day-care centers	Catholic Social Services
Day-care licensing representative	Early childhood intervention programs	Department of Children and Family Services
Early intervention specialist	Government agencies	Housing Authority
Family child caseworker	Public schools	March of Dimes
Family life specialist	Private agencies	Riley's Children's Hospital
Volunteer service director	Substance abuse centers	Village Childcare, Inc.
Youth service worker		

National Resources and Environmental Sciences

Forestry

Job Titles	Prospective Employers	Employer Examples
Biometrician	Forest trade associations	Cook County Forest Preserves
Forest and park ranger	Furniture manufacturers	Illinois Department of Conservation
Forest manager	Local, state, and federal government agencies	International Paper Co.
Forest pathologist	Lumber companies	U.S. Environmental Protection Agency
Resource conservationist	Nature centers	U.S. Forest Service
Urban forester	Outdoor experience centers	Weyerhauser
Wood scientist		

Horticulture

Job Titles	Prospective Employers	Employer Examples
Floral shop manager	Botanic gardens	George J. Ball, Inc.
Fruit and vegetable grower	Commercial fruit growers	Burpee Seed Co.
Garden center manager	Commercial lawn care companies	Butler National Golf Club
Golf course superintendent	Garden centers	Chicago Botanic Garden
Interior plantscape designer	Golf courses	Epcot Center
Landscape designer	Park districts	T. Brickman Co.
Nursery owner	Landscape contractors	Greenview Nursery
Seed and bulb marketing coordinator		Tru Green

Natural Resources and Environmental Sciences

Job Titles	Prospective Employers	Employer Examples
Environmental educators communicators researchers	Federal, state and local government agencies:	Cook County Forest Preserve
Social and environmental impact analysts	U.S. Forest Service	Illinois Department of Conservation
Ecologists	U.S. Park Service	Peace Corps
Biologists	U.S. Environmental Protection Agency	U.S. Forest Park Service
Park forest rangeland managers	State Departments of Safe Energy Environmental Protection	National Wildlife Federation Communication Council
Natural Resources and Conservation officers	Nature centers outdoor experience centers	Nature Conservancy
Nature center directors	Natural resource magazine publishers	Marion Textile Co.
Resource conservationists		U.S. Army Construction Engineering Lab
Technical sales representatives		
Fiber textile managers and consultants		
Non-profit organizations		
Educational institutions		

Information taken from "Jobs To Start In, Careers To Grow In" brochure from ACES, College of Agricultural, Consumer, and Environmental Sciences at University of Illinois in Urbana-Champaign

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County Farm Bureaus®

COUNTY	PHONE	FAX	STREET	CITY
Adams	217-222-7305	217-222-7984	330 S. 36th St., PO Box 3037	Quincy, IL 62305-3037
Bond	618-664-3100	618-664-4777	925 E. Harris Ave., PO Box 256	Greenville, IL 62246-0256
Boone	815-547-7500	815-547-6470	702 W. Locust St.	Belvidere, IL 61008-4206
Brown	217-773-2634	217-773-3032	109 W. North St.	Mt. Sterling, IL 62353-1244
Bureau	815-875-6468	815-872-5809	State Rte. 34 East, PO Box 190	Princeton, IL 61356-0190
Calhoun	618-576-2233	618-576-2272	County Road, PO Box 386	Hardin, IL 62047-0386
Carroll	815-244-3001	815-244-3067	811 S. Clay St.	Mt. Carroll, IL 61053-9770
Cass-Morg.	217-245-6833	217-245-1569	1152 Tendick	Jacksonville, IL 62650-3149
Champaign	217-352-5235	217-352-8768	801 N. Country Fair Dr., Ste. A, PO Box 3098	Champaign, IL 61821
Christian	217-824-2940	217-824-2477	400 W. Market St.	Taylorville, IL 62568-2133
Clark	217-382-4144	217-382-5788	255 W. Cumberland, PO Box W	Martinsville, IL 62442-0468
Clay	618-665-3300	618-665-3345	Church St., PO Box E	Louisville, IL 62858-0905
Clinton	618-526-7235	618-526-2156	1165 N. 4th St., PO Box 126	Breese, IL 62230-0126
Coles	217-345-3276	217-345-3905	719 W. Lincoln Ave.	Charleston, IL 61920-2425
Cook	708-354-3276	708-579-6056	6438 Joliet Rd.	Countryside, IL 60525-4642
Crawford	618-544-3792	618-544-3067	1221 N. Allen St., PO Box 247	Robinson, IL 62454-0247
Cumberland	217-849-3031	217-849-2273	402 E. Main, PO Box 8	Toledo, IL 62468-0008
DeKalb	815-756-6361	815-756-3961	1350 W. Prairie Dr.	Sycamore, IL 60178-3166
DeWitt	217-935-2126	217-935-6840	Highway 54, West	Clinton, IL 61727-0517
Douglas	217-253-4442	217-253-3300	105 N. Main, PO Box 380	Tuscola, IL 61953-0380
DuPage	630-668-8161	630-668-4162	245 S. Gary Ave.	Carol Stream, IL 60188-2006
Edgar	217-465-8511	217-463-1663	210 W. Washington St.	Paris, IL 61944-1723
Edwards	618-445-2113	618-445-2117	15 S. 5th St.	Albion, IL 62806-1116
Effingham	217-342-2103	217-342-3853	1102 W. Evergreen, PO Box 569	Effingham, IL 62401-0569
Fayette	618-283-3276	618-283-4497	1125 N. Sunset Dr., PO Box 336	Vandalia, IL 62471-0336
Ford-Iroq.	815-265-4712	815-265-4274	Rt. 45 South, PO Box 309	Gilman, IL 60938-0309
Franklin	618-435-3616	618-439-2803	Rt. 3, PO Box 457	Benton, IL 62812-0457
Fulton	309-547-3011	309-547-2324	15411-A N. State Route 100	Lewistown, IL 61542-8905
Gallatin	618-272-3531	618-272-5800	Murphy Street, PO Box 250	Ridgway, IL 62979-0250
Greene	217-942-6958	217-942-9054	319 6th St.	Carrollton, IL 62016-1247
Grundy	815-942-6400	815-942-6418	4000 Division	Morris, IL 60450-9357
Hamilton	618-643-2348	618-643-2514	US Highway 14 East, PO Box 248	McLeansboro, IL 62859-0248
Hancock	217-357-3141	217-357-2236	71 S. Adams, PO Box 360	Carthage, IL 62321-0360
Henry	309-937-2411	309-937-3960	114 N. East Street	Cambridge, IL 61238-1157
Jackson	618-684-3129	618-687-4405	220 N. 10th St.	Murphysboro, IL 62966-2132
Jasper	618-783-2733	618-783-4226	Rte. 33 West, PO Box 329	Newton, IL 62448-0329
Jefferson	618-242-4510	618-242-7069	814 Harrison St., PO Box 927	Mt. Vernon, IL 62864-0927
Jersey	618-498-9576	618-498-7006	402 S. Jefferson St., PO Box 425	Jerseyville, IL 62052-0425
JoDaviess	815-858-2235	815-858-3728	212 N. Main St., PO Box 501	Elizabeth, IL 61028-0501
Johnson	618-658-2871	618-658-2540	PO Box 335, 809 N. First	Vienna, IL 62995-0335
Kane	630-584-8660	630-584-0023	2N710 Randall Rd.	St. Charles, IL 60174-1532
Kankakee	815-932-7471	815-932-6658	1605 W. Court	Kankakee, IL 60901-3216
Kendall	630-553-7403	630-553-7460	111 Van Emmon St., PO Box [illegible]	Yorkville, IL 60560-0258
Knox	309-342-2036	309-342-4136	180 S. Soangetaha Rd., PO Box 1427	Galesburg, IL 61402-1427
Lake	847-223-6506	847-223-6508	70 US Hwy 45	Grayslake, IL 60030-2200
LaSalle	815-433-0371	815-433-9327	4201 Columbus St.	Ottawa, IL 61350-9540

COUNTY	PHONE	FAX	STREET	CITY
Lawrence	618-943-2610	618-943-4233	1406 Locust St., PO Box 498	Lawrenceville, IL 62439-0498
Lee	815-857-3531	815-857-3532	37 S. East Ave., PO Box 198	Amboy, IL 61310-0198
Livingston	815-842-1103	815-842-1104	901 W. Howard St., PO Box 410	Pontiac, IL 61764-0410
Logan	217-732-7326	217-735-1599	120 S. McLean St., PO Box 128	Lincoln, IL 62656-0128
Macon	217-877-2436	217-877-0137	1150 W. Pershing Rd.	Decatur, IL 62526-6205
Macoupin	217-854-2571	217-854-6796	220 N. Broad St., PO Box 77	Carlinville, IL 62626-0077
Madison	618-656-5191	618-692-9103	900 Hillsboro Ave., PO Box 10	Edwardsville, IL 62025-0010
Mar.-Put.	309-364-2501	309-364-3658	509 Front St., PO Box 208	Henry, IL 61537-0208
Marion	618-548-2100	618-548-2360	Highway 37 North, PO Box 640	Salem, IL 62881-0640
Mason	309-543-4451	309-543-2486	127 S. High St., PO Box 318	Havana, IL 62644-0318
Massac	618-524-5811	618-524-3032	1436 W. 10th St., PO Box 908	Metropolis, IL 62960-0908
McDonough	309-837-3350	309-836-3212	210 S. Randolph, PO Box 249	Macomb, IL 61455-0249
McHenry	815-338-1520	815-338-1522	1102 McConnell Rd., PO Box 1530	Woodstock, IL 60098-1530
McLean	309-663-6497	309-662-8231	402 N. Hershey Rd.	Bloomington, IL 61704-3546
Menard	217-632-2217	217-632-5320	101 E. Jefferson, PO Box 258	Petersburg, IL 62675-0258
Mercer	309-582-5116	309-582-5473	206 SE Third, PO Box 40	Aledo, IL 61231-0040
Monroe	618-939-6197	618-939-6241	513 W. Park St., PO Box 129	Waterloo, IL 62298-0129
Montgomery	217-532-6171	217-532-6512	102 N. Main St.	Hillsboro, IL 62049-1148
Moultrie	217-728-4214	217-728-2533	1102 W. Jackson St.	Sullivan, IL 61951-1030
Ogle	815-732-2231	815-732-3412	421 W. Pines Rd., PO Box 195	Oregon, IL 61061-0195
Peoria	309-686-7070	309-686-8008	1716 N. University	Peoria, IL 61604-3901
Perry	618-357-9355	618-357-3217	309 S. First St., PO Box 287	Pinckneyville, IL 62274-0287
Piatt	217-762-2128	217-762-7014	427 W. Marion, PO Box 223	Monticello, IL 61856-0223
Pike	217-285-2233	217-285-2421	1301 E. Washington, PO Box 6	Pittsfield, IL 62363-0006
Pope-Har.	618-683-3651	618-683-3903	407 Main St., PO Box 418	Golconda, IL 62938-0418
Pul.-Alex.	618-745-9429	618-745-9511	404 S. Blanche, PO Box 310	Mounds, IL 62964-0310
Randolph	618-443-4511	618-443-5826	PO Box G, S. St. Louis at Belmont	Sparta, IL 62286-0907
Richland	618-393-4116		710 N. West, Rte. 130 N, PO Box 367	Olney, IL 62450-0367
Rock Island	309-736-7432	309-736-1450	1601 52nd Ave., Ste. 3	Moline, IL 61265-6389
Saline	618-252-6992	618-252-8431	21 W. Robinson St., PO Box 423	Harrisburg, IL 62946-0423
Sangamon	217-753-5200	217-753-5210	2449 N. Dirksen Pkwy.	Springfield, IL 62702-1404
Schuyler	217-322-4353		114 E. Lafayette St., PO Box 20	Rushville, IL 62681-0020
Scott	217-742-3351	217-742-3184	7 Market Side Sq., PO Box 50	Winchester, IL 62694-0050
Shelby	217-774-2151	217-774-5444	Rt. 128 North, PO Box 409	Shelbyville, IL 62565-0409
St. Clair	618-233-6800	618-235-2114	1478 E. State Route 15, Box 547	Belleville, IL 62222-0547
Stark	309-286-7481	309-286-7231	1001 E. Main St., PO Box 610	Toulon, IL 61483-0610
Stephenson	815-232-3186	815-232-0016	210 W. Spring St., PO Box 748	Freeport, IL 61032-0748
Tazewell	309-347-3165	309-347-6659	1505 Valle Vista Blvd.	Pekin, IL 61554-6245
Union	618-833-2125	618-833-8611	104 W. Broad St., PO Box F	Jonesboro, IL 62952-0476
Vermilion	217-442-8713	217-442-7364	431 N. Vermilion St.	Danville, IL 61832-4641
Wabash	618-262-5865	618-263-4111	524 W. 9th St., PO Box 159	Mt. Carmel, IL 62863-0159
Warr.-Hend.	309-734-9401	309-734-6097	1000 N. Main St., PO Box 350	Monmouth, IL 61462-0350
Washington	618-327-3081	618-327-8454	246 W. St. Louis St., PO Box 112	Nashville, IL 62263-1147
Wayne	618-842-3342	618-842-3636	301 E. Court St., PO Box 526	Fairfield, IL 62837-0526
White	618-382-8512	618-384-2535	304 E. Robinson St., P.O. Box 367	Carmi, IL 62821-0367
Whiteside	815-772-2165	815-772-4588	100 E. Knox St.	Morrison, IL 61270-2619
Will	815-727-4811	815-727-5570	100 Manhattan Rd.	Joliet, IL 60433-2757
Williamson	618-993-2609	618-997-9444	1517 E. DeYoung	Marion, IL 62959-5013
Winnebago	815-962-0653	815-962-0022	1925 S. Meridian Rd.	Rockford, IL 61102-2332
Woodford	309-467-2347	309-467-6034	117 W. Center St., Box 225	Eureka, IL 61530-0225

County Farm Bureau® Activities To Assist You And Your Classroom

Many of the county Farm Bureaus across the state have active Ag in the Classroom programs carried out by a number of volunteers and staff. By contacting your county Farm Bureau office—the phone number can be found on page 22 of this resource guide—you may find a variety of resources, materials, and programs which can be incorporated into your lesson plans. The following is a sample of activities that might be offered by your county Farm Bureau; not all counties offer the same programs.

Ag Careers - The county Farm Bureau may be able to assist you in obtaining local community leaders holding a job in an ag-related field. A panel discussion for your students will show them the wide variety of career choices found in agriculture.

Classroom Visits - Many county Farm Bureaus provide volunteers to visit your classroom and present lessons on a wide variety of ag-related topics, including conservation, beef, corn, careers, etc. Call and find out what your county offers.

Farm Tours - Opportunities may be available in your county to take your class to a farm to see modern agriculture firsthand. Please remember that September, October, April, and May can be extremely busy months for farmers since harvest and planting seasons fall in those months.

AITC Materials - Ag in the Classroom educational materials are available through the Farm Bureau organization. Contact your county Farm Bureau to see if they might provide materials to your classroom. County Farm Bureaus have access to Illinois Farm Bureau's video loan library; check your county office to find out what's available.

Teacher Workshops - Training sessions for you are sponsored by some of the county Farm Bureaus. Learn about what materials are available, activities to use in the classroom, and what assistance the Farm Bureau office can provide.

Agri-Science Kits - Ten self-contained kits have been developed by the Facilitating Coordination in Agricultural Education Staff for K-8 teachers. These kits may be at your county Farm Bureau office to borrow. Fun, hands-on activities will teach your students science and math principles through applied agricultural laboratory exercises.

"Ag Expo" - Your county Farm Bureau may work with other ag-related organizations and businesses to sponsor an activity for students to learn about various topics in agriculture. Classes can be bused to the designated site and ushered in small groups to each exhibit or activity to learn about grains, livestock, conservation, food processing, careers, and other ag topics.

National Agriculture Week - Check with your county Farm Bureau to see what activities are planned during National Ag Day, March 20, or Ag Week. Your classroom could help in celebrating the date with Farm Bureau.

Additional Assistance - If your county Farm Bureau is unable to assist you, contact the AITC Program Department, Illinois Farm Bureau®, 1701 N. Towanda Ave., P.O. Box 2901, Bloomington IL 61702-2901, phone 309-557-3334 or E-mail hendersn@ilfb.org. The Illinois Farm Bureau® can put you in touch with your District AITC Coordinator.

Illinois Farm Bureau® Ag in the Classroom

Opportunities For Teachers

Grant Money Available

Every school year the Illinois Farm Bureau® Ag in the Classroom program, with support from the IAA Foundation, offers grants of up to $250 to K-8 teachers across the state of Illinois to fund projects promoting agricultural literacy in the classroom.

Applications are available every August at your county Farm Bureau. To apply for project funding, complete the application and return it to Ag in the Classroom, Illinois Farm Bureau®, 1701 N. Towanda Avenue, Bloomington, IL 61701. The deadline for applications each year is 4 p.m., on October 15. Faxed copies will not be accepted.

Applicants who are selected will be notified by the end of October.

Graduate Credit for K-8 Teachers

Each year Summer Ag Institutes, co-sponsored by Illinois Farm Bureau® and Illinois State University, Western Illinois University, the University of Illinois, Southern Illinois University, Northern Illinois University, Aurora University, and Parkland College/Earth Partners, are offered across the state for three graduate credits.

The course is designed for K-8 educators who wish to expand their curriculum to include topics related to agriculture—the world's food and fiber system. It focuses on the integration of available resources and hands-on activities about agriculture into existing classroom lessons.

Many county Farm Bureaus offer partial or full scholarships for teachers. If you would like information about the Summer Ag Institutes, please call 309-557-3334 or your county Farm Bureau.

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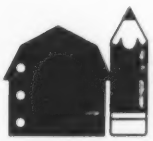

Ag in the Classroom
ILLINOIS FARM BUREAU

Kids, Crops, and Critters in the Classroom
Illinois Farm Bureau®
1701 N. Towanda Avenue, P.O. Box 2901
Bloomington, IL 61702-2901
Phone: (309) 557-3334
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